ORACLE NETSUITE

Manufacturing

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Manufacturing

Manufacturing Overview

Manufacturing processes help organizations create finished goods from raw or semi-finished materials using some combination of labor and machinery. Finished goods are then sold, at a profit, to other manufacturers, wholesalers, or retailers who then sell them to consumers.

NetSuite integrates your manufacturing workflow from the sales order and process planning to building goods, tracking work orders, and releasing finished goods for shipping.

For information about how to work with NetSuite Manufacturing, see the following help topics:

- Assembly Item Records:

  Define the members of an assembly and then track both the raw materials and the assembled items separately.
- Assembly Work Orders:

  Track the production of assembly items needed for stock or to fill orders.
- Advanced Bill of Materials:

  List the quantities of raw materials, assemblies, sub-components, and parts needed to manufacture a product at one or multiple facilities.

  > **Important:** The Advanced BOM record became available in NetSuite 2017.2. After your administrator enables the Advanced Bill of Materials feature, the Advanced BOM replaces the Assembly/Bill of Materials record.
- Bill of Materials Member Control for Assembly Items:

  Ensure that the right components are included in assembly builds at the right time. Use BOM controls to plan to use and purchase components which are effective or obsolete within specified times.
- Manufacturing Work In Process (WIP):

  Track work orders through the production process, from gathering materials, through shop floor assembly, to stocking finished goods.
- Manufacturing Routing:

  Schedule and record manufacturing operational activities against a complex work order that requires multiple teams of employees, or work centers.
- Manufacturing Preferences Overview:

  You can access manufacturing preferences at Setup > Manufacturing > Manufacturing Preferences.
- Outsourced Manufacturing:

  Outsourced manufacturing helps customers manage their subcontracted manufacturing processes by purchasing outsourced assembly production from vendors.
- SuiteAnalytics Manufacturing Workbook:

  NetSuite provides a **Manufacturing Transaction [Beta]** data source, which introduces the analytics transactions concept for manufacturing-specific transactions.
- Advanced Manufacturing SuiteApp:

  Extend your NetSuite manufacturing routing into the Advanced Manufacturing Work Bench.

  This connection enables manufacturers to define work instructions, associate material usage, compare resource supply with demand, and establish planned start and end times. To set up Advanced Manufacturing, you must install the Advanced Manufacturing SuiteApp.
- Manufacturing Mobile:

The NetSuite Manufacturing Mobile SuiteApp enables operators with little ERP knowledge to use mobile scanners to report manufacturing shop floor data. This mobile solution compliments the existing Advanced Manufacturing scanner to provide improved performance, scalability, customization support, and streamlined production activities.

- Engineering Change Order:

  Generate Engineering Change Order (ECO) records to document changes to your Bills of Materials (BOMs) and authorize the implementation of those changes.

Assembly Items

An assembly item is an inventory item made up of several components, but identified as a single item. Assemblies are manufactured by combining raw materials that you stock.

Note: For details about distinctions between Groups, Kits, and Assemblies, see the help topic Groups, Assemblies, and Kit/Packages.

After you create assembly item records that define the members of an assembly, you can track the raw materials and the assembled items separately.

For example, Wolfe Manufacturing sells the LogLeaper mountain bike that they assemble in-house. The LogLeaper is assembled from the following inventory components:

- one aluminum bicycle frame
- one set of handlebars
- one saddle
- one gearing assembly
- two wheel assemblies
- two sets of brakes
- two pedals

NetSuite tracks the stock of the LogLeaper and each component item separately. This enables Wolfe to track the stock levels of LogLeaper mountain bikes in inventory and available to ship to customers. Wolfe can also track the quantity of materials available to assemble more bicycles.

To use assembly items, you must complete the following tasks:

1. Enable the Assembly Items feature. For more information, see Enabling Assembly Items.
2. To create assembly item records that define the assembly components, select the parts that make up the assembly. For more information, see Assembly Item Records.
   - To create an assembly item record, go to Lists > Accounting > Items > New
   - On the **New Item** page, click **Assembly**. For more information, see the help topic Creating Item Records.
3. Record an assembly build:
   - After you create an assembly item record, enter an assembly build to record assembly production. Physically manufacturing assemblies in a production run increases your stock of assembled items.
   - To record inventory level changes, go to Transactions > Inventory > Build Assemblies to enter an assembly build for each production run. For more information, see Building Assembly Items.
   - After you create your assembly item, build the assembly in NetSuite to replenish stock. To record an assembly build, go to Transactions > Inventory > Build Assemblies.

   NetSuite tracks assembly item and member component records separately. It also tracks the assembly and member item stock status individually. For each assembly build you record:
   - the assembly item stock level increases
   - the member items' individual stock levels decrease

Enabling Assembly Items

Before you can create and use assembly items, an administrator must enable the Assembly Items and Inventory features.

To enable the Assembly Items and Inventory features:

1. Go to Setup > Company > Setup Tasks > Enable Features (Administrator).
2. Click the **Items & Inventory** subtab.
3. Check the **Assembly Items** box.
4. Check the **Inventory** box.
5. Click **Save**.

Assembly Item Records

You can create an assembly item record to track each assembly and its component items. The assembly record details member items and the quantity of each member required for each assembly. For more information, see Building Assembly Items.

Important: You must complete all required fields on the assembly record to ensure that any related supply plan performs properly. See the help topic Supply Planning and Routing.

Available Member Items

The following table displays the available member item types:

Regular Inventory Assembly	Serial or Lot Numbered Inventory
Inventory	Inventory
Non-Inventory	Serialized Inventory
Other Charge	Lot Numbered Inventory
Service	Non-Inventory
Regular Assemblies	Other Charge
Kit Items	Service
	Regular Assemblies
	Serialized Assemblies
	Lot Numbered Assemblies

Assembly Items in Item Lists

To make an inventory item available in your assembly build but not for sale, do not choose an income account on the item record.

By not setting an income account on an inventory item's record, the item does not appear in the sales transaction's items list. The item is sold as part of the finished goods assembly the item belongs to, which has its own income account.

If you do not set an expense account on a non-inventory item for resale, the item does not appear in the purchase transaction's item list.

Assemblies and Serial/Lot Numbered Members

Serialized and lot numbered items cannot be included as member items in a regular assembly item.

- A non-serialized assembly cannot include a serialized or lot numbered member item.
- A non-lot numbered assembly cannot include a serialized or lot numbered member item.

Serialized or lot numbered inventory items can be members of an assembly only if the assembly is serialized or lot numbered.

- A serialized assembly can include a serialized or lot numbered member item.
- A lot numbered assembly can include a serialized or lot numbered member item.

Assemblies on Purchase Transactions, Web Sites, and Work Orders

NetSuite lets you make assembly items available in other product areas.

Purchase Transactions

To make assemblies available to purchase transactions, go to Setup > Accounting > Preferences > Accounting Preferences. Check the **Allow the Purchase of Assembly Items** box on the Order Management subtab, and then save. For information about preferences, see the help topic Items/Transactions Accounting Preferences.

Web Sites

You can offer an assembly in your web site using the **Store** and **Specials** subtabs. Edit the assembly item record to add the item to your web site.

Work Orders

The Work Orders feature enables you to track the production of assembly items for stock or to fill orders. Work orders track the quantities of assemblies to be built, and the required quantities of components, or member items. Use **Special Order Work Orders** for a particular sale. Use **Production Work Orders** to increase stock. For more information, see Assembly Work Orders.

Matrix Assemblies

To use Matrix Assemblies, an administrator must enable the Matrix Items feature.

With the Assembly Items and Matrix Items features, you can create assembly item records that contain matrix options. These options help improve assembly item planning and production tracking. Matrix options make it possible to use Bills of Materials (BOM) and Manufacturing Routings to build items with numerous product styles and variations.

During production, you can create matrix assemblies using work orders and assembly builds.

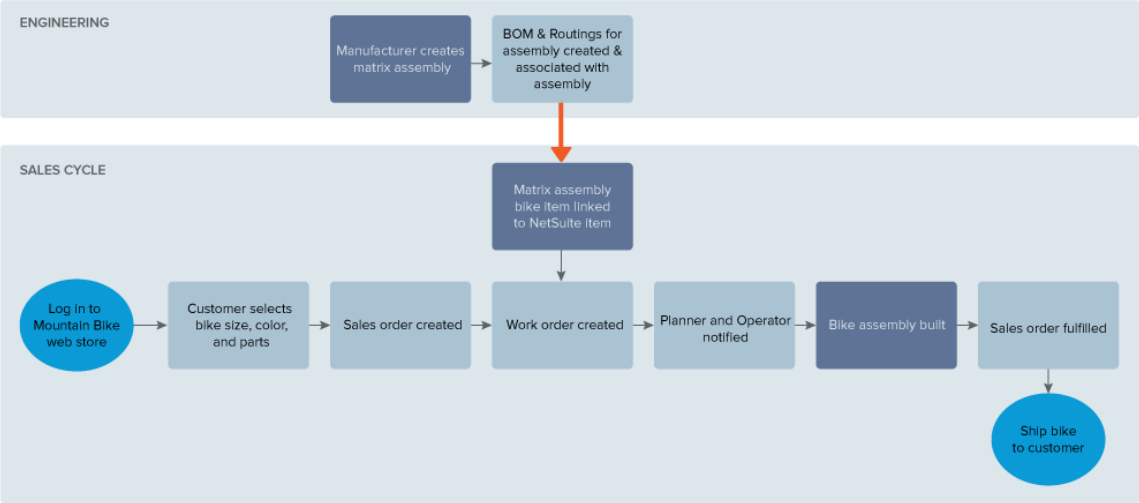
For example, Wolfe Manufacturing produces mountain bikes and sells them only on their web site, not through retailers.

1. A customer logs on to the Wolfe web store to order a bicycle.
2. While completing the sales order, the customer selects the size of the bike, its color, brakes, wheels, and other components.

   The matrix assembly record links the custom bike created and sold in the web store to the item in NetSuite.
3. NetSuite automatically converts the completed sale order into a work order.

   Each bike configuration must be associated with a BOM and routing. These describe how to build the bike, components needed, manufacturing costs, and subsequent selling price.
4. The bicycle matrix assembly record is linked with the item in NetSuite.

   This informs planners and production operators which components are required for the BOM and which manufacturing routing will be used to assemble it.
5. After the bike is assembled, the sales order can be fulfilled.
6. The bike is shipped to the customer.



Matrix assembly records enable you to manage a BOM at the parent matrix assembly level and then implement BOM changes to specific configurations. BOM options can also be maintained on an individual item record basis.

- You can track demand for matrix assemblies and then make them available in the web store. You can also build them using work orders or assembly builds.
- For web store matrix assembly items, web store administrators can display only a parent matrix assembly item. Then make configuration options available in a list.

After matrix assembly sub-items are created, you may need to update the following matrix items:

- The BOM and its attributes such as the Cost Of Goods Sold (COGS) account or Unit of Measure.
- The parent assembly item and update some or all sub-items at one time.

For more information, see Manufacturing Routing.

Creating Matrix Assembly Records

You can create a matrix assembly item record in the same way you create other matrix items.

Note: After you create a matrix assembly, the Effective Date and Obsolete Date fields do not appear on the item record Component subtab.

To use BOM Control or set effective and obsolete dates, set them on the parent matrix assembly item record. Revision control must be set on the matrix assembly child item records. For more information, see Revision Control BOM Management.

To create matrix assembly records:

1. Select one of the following options:
   - **The Matrix Assistant:**
     1. Go to Lists > Accounting > Items > New.
     2. Click **Matrix Item Assistant**.

     For more information, see the help topic Using the Matrix Item Assistant.
   - **Automatically in NetSuite**:
     1. Manually create a parent matrix assembly item.
     2. Define options to create the new assembly item.
     3. Go to Lists > Accounting > Items > New.
     4. Click **Create Matrix Items**.

     For more information, see the help topic Creating a Matrix Item Manually.
2. Click **Save**.

Updating Matrix Assembly Items

To learn how to update a matrix assembly item, see the help topic Editing Matrix Items.

When you edit a matrix assembly item parent record, you can update child item BOMs.

To update child item BOMs:

1. Click **Update Matrix**.
   - Clear the **Update BOM of Matrix Sub-items** box to not apply parent record changes to the child items.
   - Check the **Update BOM of Matrix Sub-items** box to apply parent record changes to the child items. The child items will be updated with the parent item BOM.

     Note: Previous BOMs are not updated with the changes entered.
2. Click **Save**.

Matrix Assemblies on Transactions

Work order and assembly build transactions permit you to select only child matrix assemblies. The parent matrix assemblies are not displayed in the list.

Phantom Assemblies

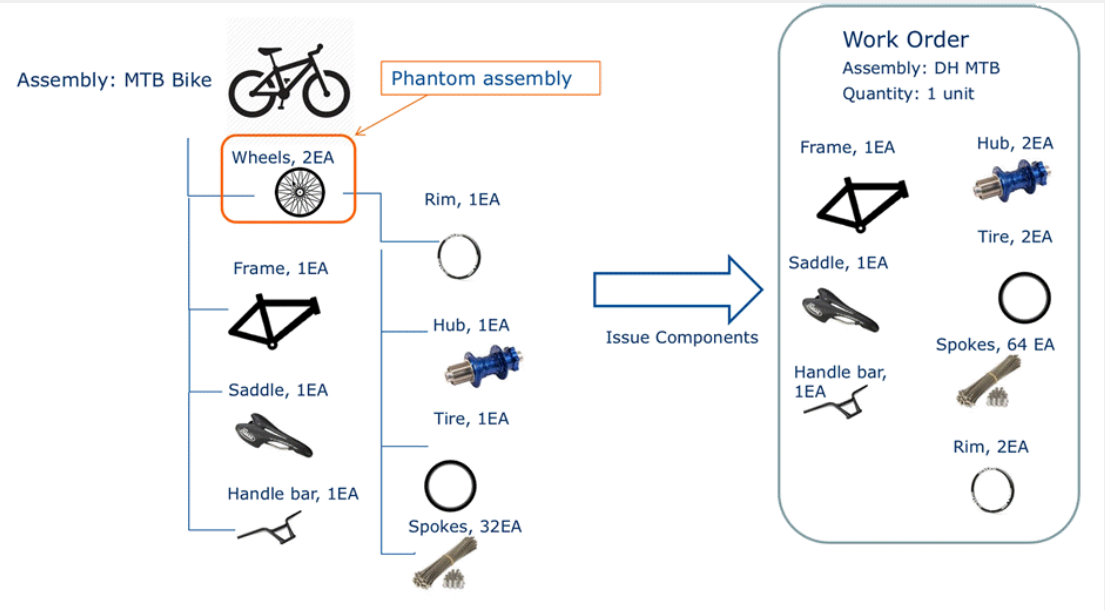
A phantom assembly is typically a non-stocked assembly that groups the components needed to produce a subassembly. For example, compare a phantom assembly to folders on a computer. The folder represents the phantom and the individual files are the components. They are called phantoms because they are not counted as inventory items, but are created to fulfill the requirements of a higher-level assembly.

Phantom Assemblies

Phantom assemblies provide the following advantages:

- No need to create multiple work orders. The phantom assembly is added to the higher-level work order.
- They work as build-to-order instructions. Components do not have to be issued from stock beforehand.
- They simplify Bill of Materials (BOM) management. If a component is changed on the Phantom BOM, it is automatically reflected in all BOMs that use the phantom as a sub-assembly.
- You can use them as configuration options for manufactured products when it would not be cost effective to keep the assembly in stock.

For example, Wolfe Manufacturing can use a phantom wheel assembly to build the wheels as part of the build assembly. With this phantom wheel assembly, Wolfe does not keep certain wheel types in stock. In this example, the phantom could include the following:



After you add a wheel assembly to the work order, you issue the components. Then, the system issues the components that make up that assembly and then adds them to the work order. For more information, see Marking Assemblies to Create Work Orders.

While phantom assemblies are typically used as components in a larger assembly build, they can also be used to create stock items. For example, as part of a warranty claim, a batch of replacement wheels could be manufactured using a phantom assembly.

Creating a Phantom Assembly

Use the following instructions to create a phantom assembly.

To create a phantom assembly:

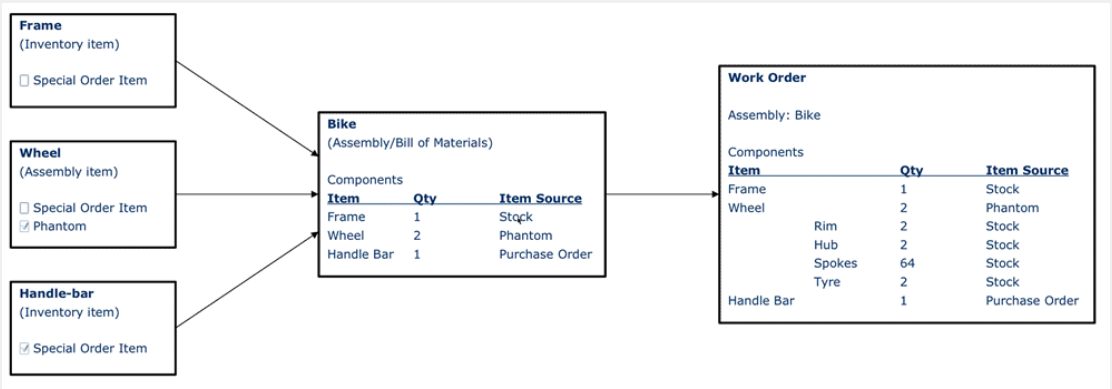
1. Go to Lists > Accounting > Items > New
2. Select **Assembly/Bill of Materials** from the **Item Type** column.
3. Complete the fields. Required fields display a red asterisk (*). For more information, see the help topic Creating Item Records.
4. On the **Purchasing/Inventory** tab Inventory Management section, check the **Phantom** box.
5. On the **Components** subtab, add the required components for the assembly and then update the **Item Source** field as required. For more information, see Item Source Field.
6. If the phantom assembly contains sub-assemblies, check the **Mark Sub-Assemblies Phantom** box to mark them as phantoms.
7. Click **Save**.

Item Source Field

The Item Source column appears on Bill of Materials (BOM), BOM Revision Record, and Work Order transactions. It is used to specify the preferred method of supply for a particular item. Source options include: Stock, Phantom, Purchase Order, and Work Order. The Assembly and BOM Revision Record item source values are then used as work order and assembly build defaults. This is then reflected in the Assembly/Bill of Material and Work Order records.

On assembly builds, NetSuite uses the item source values (stock or phantom) from the assembly and BOM revision record. However, the column field item source does not appear. The system expands the list of components on the assembly build when the list of components contains a sub-assembly with a phantom item source. You can override these default values on either the BOM record or the work order record.

The following diagram illustrates how NetSuite determines default item source values.



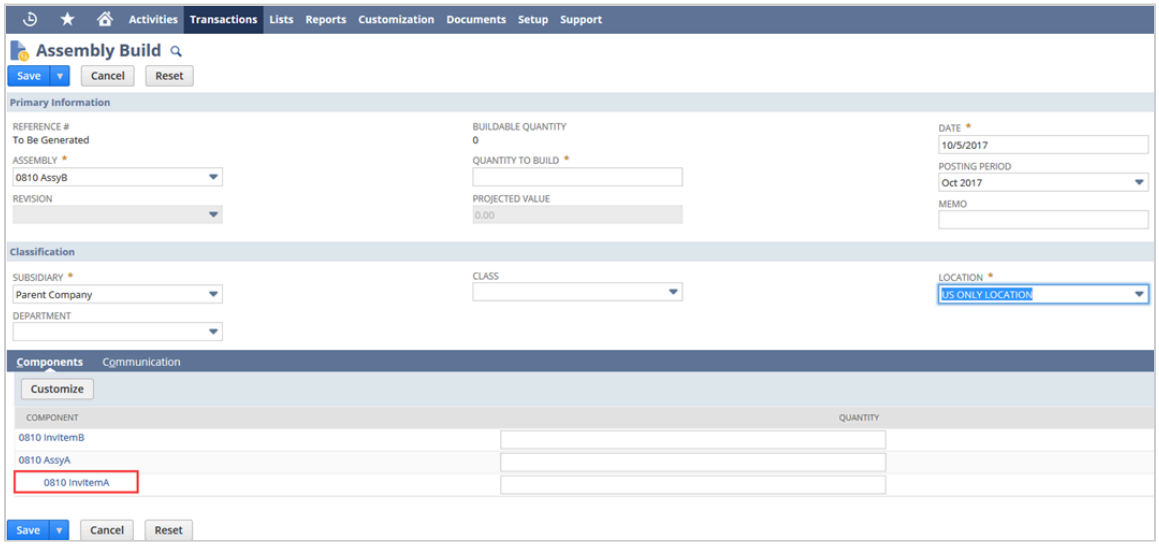
- The **Frame** is an inventory item. When the Special Order Item box is clear, the Item Source is marked as Stock.
- The **Wheel** assembly item is marked Phantom. Because the mark Sub-Assemblies Phantom box was clear, the wheel assembly work order is marked Phantom, but its sub components are taken from stock. If the Special-Order Item box is checked, the item source is marked Work Order.

- The **Handle bar** is normally an inventory item. When the Special Order Item box is checked, the Item Source is marked Purchase Order.

Item Source Set to Phantom

When the Item Source field is set to Phantom, the sub-assembly components appear indented under the Phantom on the Bill of Materials. This cannot be edited.

In the following screenshot, Assembly Build for 0810 AssyB has two components. Component 0810 AssyA is an assembly and the 0810 AssyB BOM has Item Source set to Phantom, which is why the text is indented.



Inventory Detail Field

When the Item Source field is set to Phantom, the component sub-assembly is built as a part of the higher-level assembly.

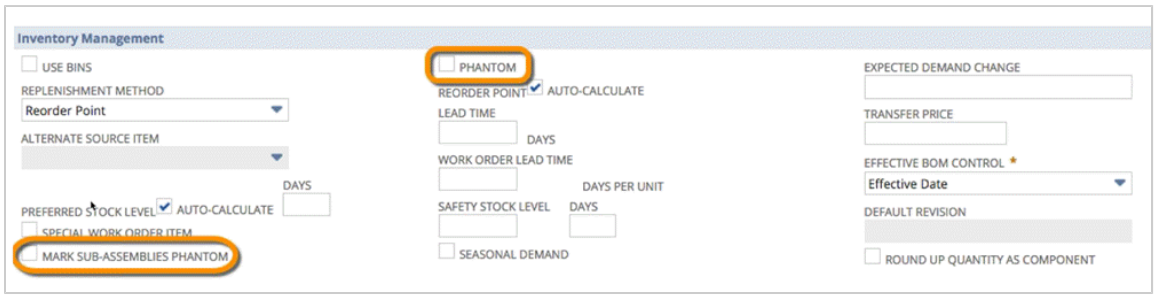
For example, Wolfe Manufacturing sells road bikes in multiple configurations and have created a BOM for each configuration. The company does not stock carbon-fiber wheels, but has the wheel components in inventory and only assembles them when ordered. The carbon-fiber wheel is a sub-assembly of the road bike assembly and the Road Bike BOM. The item source for the carbon-fiber wheel is phantom.

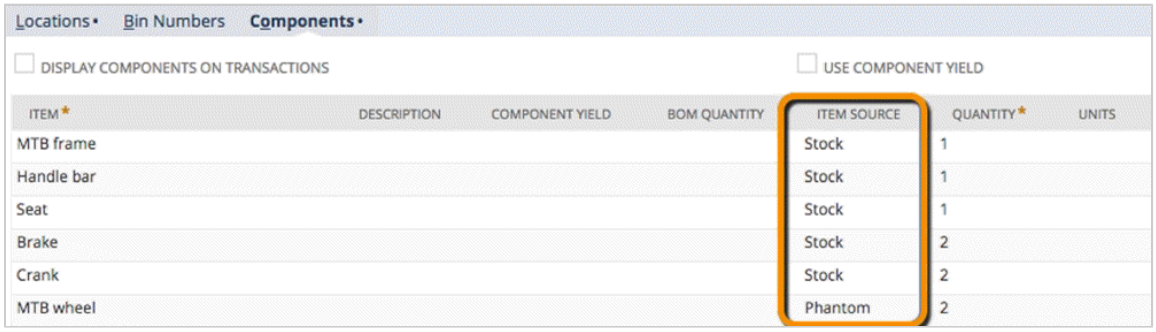
Assembly and Inventory Items can be assigned a serial or lot number when you produce or receive them. After the item is consumed, in the **Work Order Item** subtab **Inventory Detail** field, select the serial or lot number being used.

Phantom Bill of Materials on Assembly and Work Orders

To use the Phantom Bill of Materials functionality, the Assembly Items and Work Orders features must be enabled. These features are located on the Items & Inventory subtab on the Enable Features page.

When these features are enabled, phantom assembly options appear on the assembly and work order records.





The following table describes the phantom-related options:

Option	Visible on	Action Performed
Phantom	Assembly/Bill of Materials record	Check this box to mark the Item Source for this item on any bill of materials as Phantom by default. This also applies to the item source value on any work order where the item is used.
Mark Sub-Assemblies Phantom	Assembly/Bill of Materials and Work Order records	Check this box to mark all sub-assemblies on the work order as Phantom. The sub-assemblies will be built as part of the higher-level work order rather than drawn from stock. Clearing this box does not refresh the items in the Item subtab. It enables in-line editing of individual components. Clearing the Mark Sub-Assemblies Phantom box does not refresh or remove sub-assembly components on the Items subtab. This is due to support of in-line editing of individual components. To reload the BOM for a top level assembly, select a different assembly in the Assembly field. To reload a BOM for a phantom sub-assembly, change the item source for the sub-assembly back to Phantom.
Item Source	Components subtab Assembly/Bill of Materials and Work Order records	Adds Phantom as an option on the Item Source list. Enables sub-assembly components to be treated as phantoms on one BOM, and regular stock items on another.

Phantoms with Manufacturing Routing and Demand Planning

When you use manufacturing routing, define the routing steps associated with the sub-assembly build on the manufacturing routing of the higher-level assembly. For more information , see Creating a Manufacturing Routing.

An assembly demand plan with a phantom sub-assembly in its bill of materials calculates dependent demand for components of the phantom item. However, it does not calculate for the phantom itself. For more information, see the help topic Demand Planning.

Assemblies and Units of Measure

To identify units of measure on assembly item records, the Multiple Units of Measure and the Assembly Items features must be enabled.

After you select a basic unit type on an assembly record you can define a default unit for the item on a particular transaction. On item records, designate a unit to default as a purchase unit, stock unit, or sales unit.

Note: You can set purchase and sale units when you create the item record. After you save the record, these units cannot be changed. You can make a selection for the stock units when you create the item record. You can change the stock units after you save the record.

On Assembly Builds, Assembly Unbuilds, and Work Orders for Assembly Items with Units of Measure, the Units field defaults to base units. You cannot change the default.

On transactions, units of measure are used as follows:

Transaction	Editable Units	Display Units Only
Receive Order	Yes (in units that match the purchase order)	
Fulfill Orders	Yes (in units that match the sales order)	
Adjust Inventory Worksheet	Yes (in stock units)	
Replenish Location		
Build Assemblies		Yes (in base units)
Unbuild Assemblies		
Enter Work Orders		
Create Opportunities	Yes	
Prepare Estimates		
Enter Sales Orders		
Create Invoices		
Enter Purchase Orders		
Bill Purchase Orders		
Enter Vendor Return Authorizations		
Adjust Inventory		
Transfer Inventory		
Issue Credit Memos		
Write Checks		
Use Credit Card		

- Purchase orders show the item in purchase units by default.

- Invoices show the item in sales units by default.
- Inventory adjustments show the item in stock units by default.

Generated reports display units of measure based on the units used in transactions.

Serialized Assemblies

When working with serial-numbered assembly items:

- The base unit must be the lowest unit of measure when selecting a **Units Type**.
- Units cannot have a decimal unit of measure conversion with the base units when selecting **Stock Units**, **Purchase Units**, and **Sale Units**.
- The quantity of serial numbers entered must equal the quantity in base unit when a transaction is entered in a **non-base units**.

> For example, you sell a serialized assembly that uses a base unit of Each and sale unit of Dozen. When you enter a sales order for 2 of the assembly, enter 24 serial numbers on the order to represent 24 each of the item.

Lot Numbered Assemblies

After setting up a lot-numbered assembly item record, you can edit the purchase and sale units. You cannot, however, change the units type or stock units.

Assembly Builds and Unbuilds

Assembly Builds and Unbuilds must be performed in the base units of measure. For more information, see the help topic Using Item Records.

Assemblies and Work Orders

If the assembly selected on a work order uses Units of Measure, they appear in the Units field.

Work orders you view that were previously generated by NetSuite display the units for reference only and cannot be changed.

If the work order was created from another source (such as a sales order), you can change the quantity by changing the source transaction. For more information, see Assembly Work Orders.

Building Assembly Items

Each time you physically manufacture assemblies in a production run, you increase your stock of the assembled items. Record each production run and update stock levels by entering an assembly build record.

Building Assembly Items

For each assembly build you record:

- the assembly item stock levels increase
- the member items' individual stock levels decrease

Entering an assembly build for each production run updates your inventory levels.

Note: If you use work orders and have entered work orders for assemblies, see Building Work Orders to complete builds for those assemblies.

To enter an assembly build:

1. Go to Transactions > Manufacturing > Build Assemblies.
2. Under Primary Information, complete the following fields:
   a. The **Reference #** field displays a system generated number. You can enter a different reference number to track this transaction.
   b. In the **Assembly** list, select the assembly item you want to build.

      Required fields display a red asterisk (*).

      You can enter an assembly build only for assembly items on record. For more information, see the help topic Creating Item Records.
   c. Select the **Revision** of the assembly build to use.

      The revision record effective date determines when this item is included as a member for an assembly.

      When you select an assembly item, the maximum number that you can build appears in the **Buildable Quantity** field.

      If you use locations, the quantity for the selected location is displayed in the **Buildable Quantity** field.
   d. In the **Quantity to Build** field, enter the number of assembly items you want to build.
   e. The projected value of your new assemblies appears in the read-only **Projected Value** field.

      Projected value is the sum of the value of the member items times the quantity entered.
   f. If you use serialized inventory, enter serial numbers for the assemblies you are building.
   g. If you are building a lot numbered assembly, enter the expiration date of the lot in the **Expiration Date** field.
   h. If you use bin management, the assembly item record preferred bin number is displayed in the **Bin Numbers** field. By default, all assemblies are added to the preferred bin. To add some assemblies to other bins, click the Bins icon or the Inventory Detail icon.

      When you build this assembly, the bin quantity on hand for the assembly increases and the bin quantity on hand for each member item decreases.

      Note: If you use Advanced BOM, the **Bill of Materials** and **Bill of Materials Revision** lists appear.
   i. In the **Date** field, enter a transaction date.
   j. If you are building a lot numbered assembly item, enter the lot **Expiration Date** field.
      1. To receive a warning that a lot is about to expire, go to Setup > Accounting > Preferences > Accounting Preferences.
      2. On the **Items/Transactions** subtab, in **Days Before Lot Expiration Warning**, enter the number of days before a lot item's expiration to display a warning.
      3. Click **Save**.

k. If you use accounting periods, select a transaction **Posting Period**.

l. Enter a **Memo**. You can search for this text later to find this entry.

3. In the Classification section, complete the following fields:

   a. If you use NetSuite OneWorld, select a **Subsidiary**.

   b. If you track departments, select a **Department** for this transaction.

   c. If you track classes, select a **Class** for this transaction.

   d. If you track locations, select a **Location** for this transaction.

4. On the **Components** subtab, accept the default quantity of each component needed to complete the assembly. This number is taken from the assembly Item record.

   You can adjust component quantities on a build-by-build basis to allow for fluctuations in material usage. For example, a member item record shows a component quantity of 2. You can create a build that has 3 of the component to fill a particular order. As the quantity changes, your projected value is updated.

   > **Note:** You can change the quantity of members on a serialized or lot numbered assembly. Use the assembly serial or lot numbers to track assembly items created with special member quantities. You cannot track non-serial or non-lot assemblies that could have special quantities of member items. Therefore, you may want to build non-serial or non-lot assemblies with special quantities. You can build when your available quantity of that assembly is zero and you are building assemblies with special quantities for a customer order.

5. Click the **Communication** subtab.

   a. Enter events on the **Events** subtab. For example, maintenance, repair, or setup.

      i. Enter the event name or **Title**. For example, Assembly Work Center Setup.

      ii. Enter the event **Location**. For example, West Coast Assembly.

      iii. Accept today's **Date** or use the calendar to enter a different date.

      iv. If this is an all day event, check the **All Day** box.

      v. Enter event **Start** and **End Times**.

      vi. Click **Add**.

      To add more events, repeat this procedure.

      For example, Setup could start at 7:00 am and end at 7:30 am. Then, Assembly could start at 7:30 am and end at 3:30 pm. Finally, Breakdown could start at 3:30 pm and end at 4:30 pm.

   b. On the **Tasks** subtab, view or enter CRM tasks records. For information on tasks, see the help topic Working with CRM Tasks.

   c. The **Phone Calls** subtab enables you to view or enter phone calls.

   d. The **Files** subtab enables you to attach files from the NetSuite File Cabinet, your computer, or the internet.

      - To add a file from the File Cabinet, select one from the **Attach File** list.

        After the file loads, NetSuite fills the **Folder**, **Size**, **Last Modifed**, and **File Type** fields.

      - To add a new file, in the **Attach File** list, select **New**.

        Complete the List window.

   e. On the **User Notes** subtab, add and track notations.

6. Click **Save**.

After an assembly item is built, it is treated like an inventory item for inventory costing purposes. The built assembly item asset/costing value is the total value of the assembly's member items. These values act like the assembly item's purchase price for inventory costing calculations.

Note: If you use NetSuite OneWorld, you can select the purchase currency on non-inventory items for purchase and resale.

Inventory costing is tracked for the assembly item based on the inventory costing method chosen at Setup > Accounting > Preferences > Accounting Preferences. For information on inventory costing, see the help topic Using Item Records.

Unbuild Assembly Items

After you complete an inventory build, you may need to unbuild some assemblies. For example, Wolfe Manufacturing receives an order for one hundred mountain bikes. While building the bicycles, the customer cancels the order. Wolfe unbuilds the assembly items that are not sold, and maintains the stock as raw materials.

Unbuilding an assembly updates inventory levels on records for the finished assembly item and for each member component individually. For each assembly you unbuild:

- the assembly item stock level decreases
- the member item's individual stock levels increase

There are two methods to unbuild an assembly:

- You can unbuild an assembly from the Assembly Build transaction.
- You can generate a new unbuild transaction.

Unbuilding an Assembly From the Assembly Build Transaction

NetSuite lets you unbuild an assembly from the original assembly build transaction. When you unbuild from this transaction, NetSuite generates a new unbuild transaction with all of the details from the original transaction.

To unbuild an assembly from the assembly build transaction:

1. Go to Transactions > Manufacturing > Build Assemblies > List.
2. Click **View** next to the assembly you want to unbuild.
3. On the Assembly Build page, click **Unbuild**.

   An unbuild transaction opens with the build information populated.

Unbuilding as Assembly From a New Unbuild Transaction

If you do not want to unbuild an assembly from the original assembly build transaction, you can unbuild from a new unbuild transaction.

To unbuild an assembly from a new unbuild transaction:

1. Go to Transactions > Manufacturing > Unbuild Assemblies
2. Under Primary Information, complete the following fields:
    a. The **Reference #** field displays a system generated number. You can enter a different reference number to track this transaction.
    b. In the **Assembly** list, select the assembly item you want to unbuild.

       Required fields display a red asterisk (*****).

       When you select an assembly item, the maximum number that you can unbuild appears in the **Quantity Built** field.

       If you use locations, the quantity that appears in the **Quantity Built** field is for the selected location.

       > **Note:** If you use Multi-Location Inventory, when you select an assembly item and location, the maximum number you can unbuild appears in **Quantity Built**. If you do not select a location, the maximum number that you can unbuild does not appear in this field.

    c. If you use serialized inventory, enter the **Serial Numbers** for the assemblies you plan to unbuild.
    d. If you use bin management, select the **Assembly Item Record Bin Number** from **Bin Numbers** list. By default, all assemblies are removed from the preferred bin. To remove some items from other associated bins, click the Bins icon or Inventory Detail icon.

       When you unbuild this assembly, the bin quantity on hand decreases, and the bin quantity on hand for each member item increases.
    e. If you enabled Advanced Bill of Materials, select a **Bill of Materials**.
    f. If you enabled Advanced Bill of Materials, select a **Bill of Materials Revision**.
    g. In the **Quantity to Unbuild** field, enter the number of assembly items you want to unbuild.

       You cannot enter a quantity that exceeds the number in the **Quantity Built** field.
    h. The projected value of your disassembled items appears in the **Projected Value** field.

       Projected Value is the sum of the value of the member items times the quantity entered.
    i. In the **Date** field, enter the transaction date.
    j. If you use accounting periods, select a transaction **Posting Period**. You cannot post to a closed period.
    k. Enter a **Memo**. You can search for this text later to find this entry.
3. In the Classification section, complete the following fields:
    a. If you use NetSuite OneWorld, select a **Subsidiary**.
    b. If you track departments, select a **Department** for this transaction.
    c. If you track classes, select a **Class** for this transaction.
    d. If you track locations, select a **Location** for this transaction.
4. The **Components** subtab provides the inventory detail for each component.
5. Click the **Communication** subtab.
    a. Enter events on the **Events** subtab. For example, maintenance, repair, or setup.
        i. Enter the event name or **Title**. For example, Assembly Work Center Setup.
        ii. Enter the event **Location**. For example, West Coast Assembly.

iii. Accept today's **Date** or use the calendar to enter a different date.

iv. If this is an all day event, check the **All Day** box.

v. Enter event **Start** and **End Times**.

vi. Click **Add**.

To add more events, repeat this procedure.

For example, Setup could start at 7:00 am and end at 7:30 am. Then, Assembly could start at 7:30 am and end at 3:30 pm. Finally, Breakdown could start at 3:30 pm and end at 4:30 pm.

b. On the **Tasks** subtab, view or enter CRM tasks records. For information on tasks, see the help topic Working with CRM Tasks.

c. The **Phone Calls** subtab enables you to view or enter phone calls.

d. The **Files** subtab enables you to attach files from the NetSuite File Cabinet, your computer, or the internet.

- To add a file from the File Cabinet, select one from the **Attach File** list.

  After the file loads, NetSuite fills the **Folder**, **Size**, **Last Modifed**, and **File Type** fields.

- To add a new file, in the **Attach File** list, select **New**.

  Complete the List window.

e. On the **User Notes** subtab, add and track notations.

6. Click **Save**.

After you save the transaction, your inventory count of the assembly item decreases and the inventory count of the member items increases accordingly.

Assembly Unbuild Variance Posting

Assembly item unbuilds could generate a difference between the item cost at assembly time and the item cost at unbuild time. In the assembly item record **Unbuild Variance** field, select an account for posting variance amounts.

For example, when you unbuild an assembly, each component is restocked and the item cost for each component is calculated. Any variance between the assembly cost and the unbuild cost posts to the selected Unbuild Variance account on the item record for that assembly.

If no variance account is selected for an assembly item, variance amounts for that item post to the Cost of Goods Sold (COGS) account.

To set the variance account for an item:

1. To open the assembly item record, go to Lists > Accounting > Item.
2. In the **Unbuild Variance Account** field, select the account where you want to post variance amounts.
3. Click **Save**.

Assembly Unbuilds and the Adjust Inventory Worksheet

When you enter an Adjust Inventory Worksheet, it deletes the previous assembly unbuild cost history. To maintain costing history for an assembly, enter an inventory adjustment, not a worksheet.

Unbuilding Assemblies and Purchased Assembly Costing

If you use the **Allow Purchase of Assembly Items** preference, the following paragraph explains how NetSuite handles costing for assemblies you unbuild. For information about manufacturing preferences, see the help topic Manufacturing Preferences Overview.

When unbuilding an assembly item, NetSuite uses historical costing to determine member item values. For example, a member item's historical transactions display a cost of $25. NetSuite uses this amount to calculate cost for the member item after the assembly unbuild.

If the assembly being unbuilt was purchased from a vendor, a member item has no previous transactions. The historical cost to be considered is $0 and member items in this case would have a value of $0.

If you want to adjust your inventory prior to an unbuild or rather than unbuilding an assembly, refer to the following procedures:

- Entering an Inventory Adjustment Before the Unbuild
- Entering an Inventory Adjustment Rather Than an Assembly Unbuild

Entering an Inventory Adjustment Before the Unbuild

You can enter an inventory adjustment before the unbuild to establish item cost. Add a quantity of 1 and save the form, edit the form, and then enter a new line to remove a quantity of 1.

The following example describes the transaction sequence for assembly item ABC.

To enter an inventory adjustment prior to unbuild:

1. Go to Transactions > Inventory > Adjust Inventory.
2. In the **Adjustments** subtab, in the **Item** field, select an item. For example, Member item ABC. Required fields display a red asterisk (*****).
3. Enter a value in the **Adjust Qty. By** field. For example, enter 1.
4. Enter a **Current Value**. For example, $25.00.
5. Click **Save**.
6. Click **Edit** on the adjustment.
7. In the **Item** field on a new line, select the item you edited. In this example, click Member item ABC.
8. Enter a quantity of **-1**.
9. Verify a value of **$25.00**.
10. Click **Add** and then click **Save**.

When the assembly is unbuilt, member item ABC is valued at $25.

Entering an Inventory Adjustment Rather Than an Assembly Unbuild

In the following procedure, you enter an inventory adjustment rather than an assembly unbuild. This removes the assembly from stock and adds the member items.

To enter an inventory adjustment instead of an assembly unbuild:

1. Go to Transactions > Inventory > Adjust Inventory.
2. In the **Item** field, select **Assembly Item XYZ**.

   Required fields display a red asterisk (*****).
3. Enter a quantity of **-1**.
4. Enter a value of **$100.00** and then click **Add**.
5. In the **Item** field, select **Member item 1**.
6. Enter a quantity of **1**.
7. Enter a value of **$75.00** and then click **Add**.
8. In the **Item** field, select **Member item 2**.
9. Enter a quantity of **2**.
10. Enter a value of **$25.00**.
11. Click **Add** and then click **Save**.

The assembly is removed from inventory and the appropriate number of member items is added to inventory.

Marking Work Orders Built

NetSuite enables you to show work order items as assembled without completing all the steps.

When you mark an order as built, the required items are marked built and added to inventory.

Note: Associated variances are not created when you mark an order built.

To mark a work order built:

1. Go to Transactions > Manufacturing > Mark Work Orders Built.
2. Select a **Location** to filter the list of orders.
3. Select an **Item** to filter the list of orders.
4. Select a **Customer** to filter the list of orders.
5. Check the **Mark Built** box next to each order.
6. Click **Save**.

Marking Work Orders Closed

For some work orders you may want to show the items as being assembled without completing all the steps. In such a case you can skip the steps and mark the order as closed.

When you mark an order as closed, the required items are marked closed and added to inventory.

Note: Associated variances are created when you mark an order built. For information about variances, see the help topic Using Item Records.

To mark a work order closed:

1. Go to Transactions > Manufacturing > Close Work Orders.

2. In Primary Options and Criteria, complete the following:
    a. Select the **Posting Period** you want to post this transaction to. You cannot post to a closed period.
    b. Enter a transaction **Date**.
    c. Select a transaction **Location**.
    d. Select an assembly **Item** to filter the list and show only work orders for the item.
    e. Select a **Customer** to filter the list for transactions associated with the customer. Select All to show all transactions.
    f. Check the **Include In-Process Work Orders** box to include work orders with In Process and Built status.
    g. In the **Under-Produced Variance Tolerance (%)** field, enter a percentage to close only orders that produced less than planned. This helps you determine whether to keep some orders open because they have not produced enough finished product.

        Order variance calculation: (quantity ordered - quantity built/quantity ordered) = variance percentage

        Entering a percentage in this field filters the list of orders to close to show only orders with a variance lower than the percentage entered.
    h. In the **Production Variance Tolerance (%)** field, enter a percentage to filter orders with a specific value variance.

        Order variance calculation: absolute value (remaining WIP value / WIP of assembly) = variance percentage

        Entering a percentage in this field filters the list of orders to close to show only orders with a variance lower than the percentage entered.
3. In Date Range Criteria, choose from the following:
    - To filter by an order date range, enter a beginning date in the **Order Date From** field. Enter an end date in the **Order Date To** field.
    - To filter by a production start date range, enter a beginning date in the **Production Start Date From** field. Enter an end date in the **Production Start Date To** field.
    - To filter by a production end date range, enter a beginning date in the **Production End Date From** field. Enter an end date in the **Production End Date To** field.
4. In Orders, complete the following:
    a. Check the **Close** box next to each order to be closed.
    b. Verify the quantities and variances displayed for each order.
    c. Click **Submit**.

Printing an Item Bill of Materials

A Bill of Materials (BOM) lists all the components of your assembly item, the assembly quantity, and the total quantity for each.

If one of the components of your assembly item is an assembly item, each item subcomponent appears. Each subcomponent displays the quantity needed for each subcomponent to complete the assembly.

For example, your assembly item contains four components—Item A, Item B, Item C, Item D. Item B is an assembly item made up of Widget 1 and Widget 2. Two of each widget are necessary for assembly of Item B. And two of Item B are needed to complete the parent assembly. The quantity needed to complete assembly Item B must be doubled to complete the parent assembly.

The following table displays the assembly bill of materials:

Parent Assembly

Name	Assembly Quantity	Total Quantity
Item A	1	1
Item B	2	2
Widget 1	2	4
Widget 2	2	4
Item C	5	5
Item D	1	1

To print a bill of materials for an assembly item:

1. Go to Lists > Accounting > Items.
2. To open the **Filters** section, click the + icon.
3. In the **Type** field, select **Assembly** to filter your item list to show assembly items.
4. Click **View** next to the item you want to print the bill of materials (BOM) for.
5. To print the BOM, click the **Print** icon.
6. When the window containing your BOM opens, click the **Print** icon.

   You can also click **Export** in this window to open or save your BOM as a CSV file.

To learn another way to view BOM details, see Bill of Materials Inquiry.

To learn how to print a bill of materials for work orders that you enter, see Printing a Work Order Bill of Materials.

Bill of Materials Inquiry

If you use Assembly Items, the Bill of Materials (BOM) Inquiry enables you to see the build requirements for an assembly item. The BOM Inquiry displays the member components of the assembly, and the number of each component needed for each assembly.

For example, you can run BOM Inquiry to identify the materials needed to assemble a Mountain Bike. The inquiry shows that you need two wheels, one frame, one seat, and one handle bar. The inquiry also shows the sub-assembly (phantom assembly) components for each wheel: one rim, one hub, one, tube, one tire, and spokes.

Note: Custom roles must specify access to view this inquiry. For more information, see the help topic Customizing or Creating NetSuite Roles.

To run a Bill of Materials Inquiry:

1. Go to Transactions > Manufacturing > Bill of Materials Inquiry.
2. Select the assembly you want to show a BOM for.
3. If you use the multi-location inventory feature, select a **Location** to view data for that location.

Required fields display a red asterisk (*).

If you use Advanced BOM, see Running a BOM Inquiry.

4. Choose a level of detail:
   - Check the **Top Level Only** box to show only the top level member items details (sub-assembly information is not shown).
   - Clear the **Top Level Only** box to show details about all levels of member items.
5. In the **BOM Display Control** list, select **By Date** or **By Revision** to decide what to include in an assembly.

   Note: This field is available only when an assembly item uses Revision Control for its Effective BOM Control value.

   When assembly items use Effective Date as Effective BOM Control value, the **Date** field determines the date when querying components of the assembly item.

   Components are displayed based on the following criteria:
   - Selected date is greater than or equal to the effective date.
   - Selected date is less than or equal to the obsolete date.

   If an assembly item uses Revision Control, you can query the components either By Date or By Revision.
   - If you select **By Date**, then follow the process described in step 5 above.
   - If you select **By Revision**, in the **Revision** field, select a revision.

     The active components for the revision are displayed and the date field displays the revision effective date.

The inquiry displays all components used in a multi-level bill of materials structure, using a nested tree view.

The Bill of Materials Inquiry displays the following items:

Column Label	Explanation
Component Name	The name of the Component as defined in the Item Name field
Level	Where the component appears on the BOM tree structure
Component Yield	Shows how much of this component is available for final assembly, after accounting for loss/scrap in the production process A yield factor of 0.9 means that 90% of the usage quantity of the component on a bill becomes part of the finished assembly.
BOM Quantity per Assembly	The quantity required for this assembly according to the BOM
Quantity per Assembly	The quantity required when component yield is taken into consideration
Quantity per Top Level Assembly	The total quantity of this component required to make the top-level assembly Top level items are typically finished products. For example, a Barbecue grill set.
On Hand	Number of items physically held at the specified location
Available	Uncommitted stock of item
Back Ordered	The quantity of any unfulfilled order or existing commitment for this component

Column Label	Explanation
On Order	The total quantity ordered of this component across all current work orders

To display information stored in custom item fields for each component, click **Customize**.

Export or Print a Bill of Materials Inquiry

For more flexibility to work with data outside of NetSuite, you can print or export the results of a Bill of Materials Inquiry.

Click the printer icon at the top of the inquiry page to print or export (Excel or CSV) the inquiry results.

Note: The data in the inquiry header (such as location and date) is not exported. Only the table data resulting from the inquiry is exported. Only the columns shown on the query export page can be exported or printed.

For more information, see Printing an Item Bill of Materials for an alternate way to view BOM details.

Costed Bill of Materials Inquiry

Costed BOM Inquiry enables you to examine the standard cost breakdown of an assembly. The Costed BOM Inquiry report displays individual and aggregated assembly costs. This report shows how different cost components roll up to an assembly item based on the Bill of Materials (BOM). This includes material and conversion costs (labor and machine costs).

For example, the Costed BOM Inquiry helps a cost accountant in a manufacturing environment see the different cost components associated with building an assembly. It can also show how each component is calculated and rolled up to the finished goods.

This provides visibility into variances between inventory values at a certain time (displayed on the Inventory Valuation reports). It also provides visibility in the desegregated component costs of the assembly.

Note: To use the Costed BOM Inquiry, enable the Standard Costing and Assemblies features. This inquiry can be run only for a standard cost assembly item.

After you select the subsidiary, location, and assembly, the inquiry displays the cost breakdown of the assembly and its member components. This assembly cost is calculated based on the standard cost of components.

For assemblies that have a conversion cost, the assembly cost is calculated as follows:

- Component cost is based on the component cost displayed in the inventory revaluation transaction.
- Conversion cost is based on the assembly inventory revaluation transaction.

For assemblies that do not use routing, the assembly cost is based on the component cost displayed in the inventory revaluation transaction.

To run a Costed Bill of Materials Inquiry:

1. Go to Transactions > Manufacturing > Costed Bill of Materials Inquiry.
2. If you use OneWorld, select a **Subsidiary**.
3. Select the **Assembly** you want to show a costed BOM for.

4. If you use the multi-location inventory feature, select the **Location** you want to view data for.
5. To show only the top level member items details check the **Top Level Only** box. Sub-assembly information is not shown.

   Clear the Top Level Only box to show all member items.
6. To decide what to include in an assembly, select a **BOM Display Control** option:
   - **By Date** – determines the date for querying assembly item components.

     Components are displayed based on the following criteria:
     - Selected date is greater than or equal to the effective date.
     - Selected date is less than or equal to the obsolete date.
   - **By Revision**

     This field is available only when an assembly item uses Revision Control for its Effective BOM Control value.

   When assembly items use Effective Date as the Effective BOM Control value, the date field determines the date querying components of the assembly item.

   If an assembly item uses Revision Control, you can query the components either by Date or by Revision.
   - If you select **By Date**, then follow the process described in step 5 above.
   - If you select **By Revision**, then in the **Revision** field, select a revision.

     The active components for the revision are shown and the **Date** field displays the revision **Effective Date**.

   Note: If you have enabled the Advanced BOM feature, the Bill of Materials and Bill of Materials Revision lists will be displayed.
7. Select the **Bill of Materials** you want to run.

   For more information, see Advanced Bill of Materials.

   The **Bill of Materials Revision** field is automatically populated.
8. To change the inquiry **Effective Date**, enter a date, or click the calendar icon to select a date.
   - The **Top Level Material Cost** field displays the material cost for the top level assembly selected. This cost is summed for all components.
   - The **Top Level Conversion Cost** field displays the routing cost for the top level assembly.

     This field is available only if you enable the Manufacturing Routing feature.
   - The **Total Unit Cost** field displays the sum of Top Level Material Cost plus Top Level Conversion Cost.

     Component costs are displayed only for standard cost components. Non-standard cost components are displayed with a cost of zero.
9. To display information stored in custom item fields for each component, click **Customize**.

Note: To display a value, sub-assemblies must be a standard cost type. If a sub assembly contains a component, the unit cost value is taken as a sum of all components costs.

Export or Print a Costed Bill of Materials Inquiry

For more flexibility to work with data outside of NetSuite, you can print or export the results of a Costed Bill of Materials Inquiry.

Click the printer icon at the top of the inquiry page to print or export (Excel or CSV) the inquiry results.

The data in the inquiry header (location and date) does not get exported. Only the tabular data resulting from the inquiry is exported. Only the columns shown on the query export page can be exported or printed.

For more information, see Printing an Item Bill of Materials for an alternate way to view BOM details.

Printing Assembly Item Materials on Transactions

You can print all the members of an assembly item, including display names, quantities, descriptions, and rates on an invoice or other transaction form. Alternatively, you can print only the description and amount of the assembly item on the form.

Note: If you have enabled Advanced Bills of Materials, this feature is not available.

To print raw materials on transactions:

1. Go to Lists > Accounting > Items.
2. In the **Type** field, select **Assembly** to filter your item list to show assembly items.
3. Click **Edit** next to the assembly item you want to change.
4. Check the **Display Components on Transaction** box.
5. Click **Save**.

Note: You must enter a display name on the member item records for an item name to appear.

Your administrator can customize the layout of your printed forms using Advanced PDF/HTML templates.

For more information, see the help topic Advanced PDF/HTML Templates.

Printing Assembly Labels

The following procedure describes how to print labels for assembly member items and the assembly item.

To print labels for each member item and the assembly item:

1. Go to Transactions > Management > Print Checks and Forms.
2. Click **Item Labels**.
3. On the **Print Item Labels** page, click **Customize**.
4. On the **Customize Sublist** page, click the **Additional Filters** sublist.
5. Check the **Component Of** box.
6. Click **Save**.
7. On the **Print Item Labels** page, select the assembly from the **Component Of** list.
8. Click **Mark All**.
9. Click **Print**.

Running the Component Where Used Inquiry

The Component Where Used Inquiry enables you to view where components are used in assembly items, including parent assembly and sub-assembly items.

For example, item#24567 (a table leg) is a component in items that you assemble. Run the Component Where Used Inquiry to learn where that component is used:

- item#44555, small square table, requires 4 table legs per assembly
- item#55666, medium console table, requires 3 table legs per assembly
- item#66777, large rectangle table, requires 6 table legs per assembly

Data is also returned for sub-assembly component requirements:

- item#77888, 3-piece table set, includes one small square table, one medium console table, and one large rectangle table.
- To produce one of item #77888 requires 13 table legs per assembly.

To run the Component Where Used Inquiry:

1. Go to Transactions > Manufacturing > Component Where Used Inquiry.
2. Enter criteria in the following fields to filter the results returned:
    1. Select a **Component** that is required for an assembly item or sub-assembly.

       Components represent level zero in the structure.
    2. If you use the Multi-Location Inventory feature, select a **Location**.
    3. Check the **Single Level Only** box to limit the display to only one level below the component.

       Clear this box to display all levels for the assembly.
    4. Enter an active **Date** for revision control and obsolete dating.

       This represents the date an assembly must be active to be included in the results list.

       If specified on the item record, assembly active dates start on the Effective Date and end on the Obsolete Date,

       For example, an assembly item Effective Date is January 1, 2017 and its Obsolete Date is December 31, 2019.

       - If you enter an active date of January 1, 2016, the assembly item does not appear in the results.
       - If you enter an active date of January 1, 2018, the assembly item appears in the results.

       > **Note:** If a parent assembly item is not active for the specified date, then child item does not appear in the list.
3. Based on the criteria selected, you could see the following fields:
    - **Assembly** – The name of the assembly item that uses the component selected in the header.
    - **Level** – The level in the Bill of Materials (BOM) structure where the component resides.

      For example, a level 1 item is a sub-member of the parent (selected) component item. A level 2 item is a sub-member of the level 1 item.
    - **Quantity per Assembly** – The amount of the component required to build the assembly.

- **On Hand** / **Available** / **Back Ordered** / **On Order** – Quantities are displayed for the selected location.
- **Units** – The units for the component.
- **Effective Date** – The date the assembly becomes effective.
- **Obsolete Date** – The date the assembly is no longer effective.

The inquiry in the following example is run to determine where the Table Leg item is used as a component.

The following is selected in the inquiry header:

- **Component**: Table Leg
- **Single-Level only**: No

Item	Level	Qty Required per Assembly	Qty Required per Top-Level Assembly
Table: European	1	4	4
European Table Set Box	2	1	4
Table: American	1	6	6
American Table Set Box	2	1	6
Patio Side Table	1	4	4
Patio Table Pair Set	2	2	8
Patio Table Box Set	3	1	8

The following is the same inquiry, with Single-Level only set to Yes.

Item	Level	Qty Required per Assembly	Qty Required per Top-Level Assembly
Table: European	1	4	4
Table: American	1	6	6
Patio Side Table	1	4	4

Assembly Work Orders

When you enable the Work Orders feature, you can use assembly work orders for your assembly items.

Assembly work orders track the production of assembly items needed for stock, or to fill orders. Work orders track the quantities of assemblies that need to be built, and the quantities of components, or member items, needed to do so.

For example, if you stock and sell mountain bikes, you can enter a work order to do the following:

- Track the quantity of mountain bikes that need to be assembled
- Commit member items available in stock to the work order
- Track when the mountain bikes are assembled and the work order is completed to ensure mountain bikes can be stocked or sold

Sales Orders Linked to Work Orders

If a work order is created from a sales order, the two transactions are linked. Please note the following about making changes on sales orders or work orders that are linked:

- If you close a line on a sales order that links to an assembly, the link to the work order remains. The work order remains open and the finished assembly from the build is added to general inventory.
- If you change the quantity on a work order line, note the following. If the quantity exceeds the amount on the corresponding sales order line, the link to the sales order remains. When the build is completed, the excess assemblies are added to general inventory.
- Sales orders that are cancelled are no longer linked to work orders.

Assemblies and Advanced Inventory Management Calculations

If you use Advanced Inventory Management and auto-calculation for inventory items that are components of assemblies, note the following. NetSuite bases demand on work orders as well as sales using the following calculation:

Qty of assembly * qty per assembly

Orders for finished assemblies are included in calculations of demand, reorder points, and preferred stock levels for member inventory items.

You can choose to base demand on sales instead of sales orders if you use the **Transactions to Consider** preference. This preference determines if work orders and builds are included in demand calculations for assembly components. For more information, see the help topic Setting Up Advanced Inventory Management.

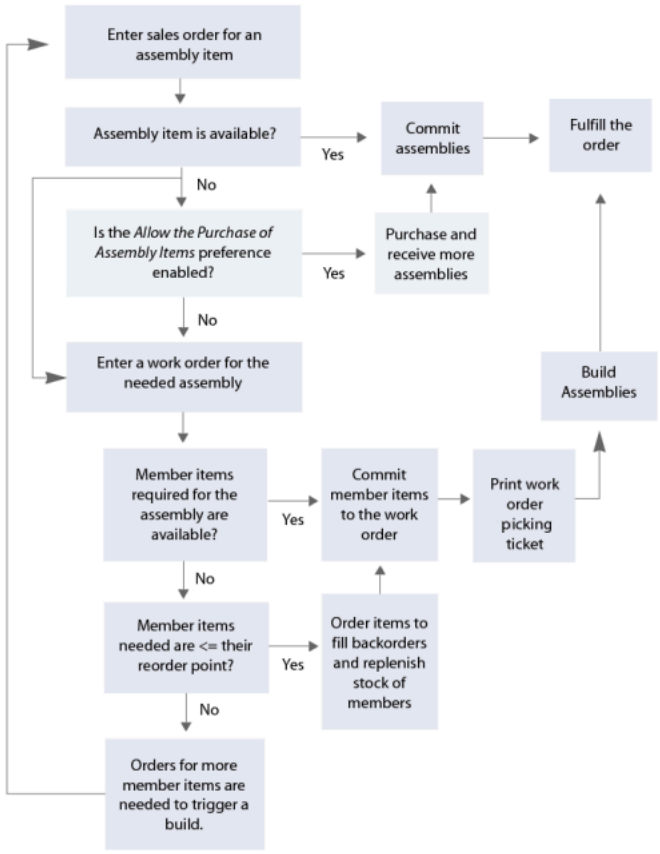
Note: For transaction customization purposes, assembly work order forms are classified as sales forms. If you create a custom transaction field and apply it to sales transactions, it shows on work order forms.

Assemblies and Units of Measure

If you use Multiple Units of Measure, see Assemblies and Units of Measure.

You can make changes on work orders after you create them. For more information, see Editing a Work Order.

Assembly Work Orders Workflow Chart



Work Order Statuses

Work orders can have the following statuses:

- **Planned** – No components are committed regardless of commit option settings.
- **Released** – No transaction has posted and no activities have been recorded. Components can be committed based on commit option settings.
- **In Process** – A transaction has been posted.
- **Built** – The quantity built is equal to the quantity planned.
- **Closed**

Setting the Use Component Yield Preference

Two Types of Assembly Work Orders

There are two types of assembly work orders you can use:

- **Special Order Work Orders**

Special order work orders track assemblies to be built for a particular sale. The work order can be linked to the originating sale.

Sold assembly items where member items are in stock but not finished goods, NetSuite adds a work order to the work order creation queue. Based on the amount of finished product needed for the order, member items are committed to the work order to build the finished assemblies.

- **Production Work Orders**

  Production work orders track assemblies that need to be built to increase stock and are not intended for a particular sale. Production work orders are not linked to a sales order and have no customer assignment.

  Production work orders are generated when the back ordered quantity of an assembly reaches its assigned build point. After the build point is reached, NetSuite adds a work order in the Mass Create Work Orders queue.

  For each work order, a bill of materials (BOM) is generated to facilitate picking member items for the build. When this work order completes, the regular stock level of the assembly increases and the finished goods are committed to open sales orders.

Both production and special order work orders use the same Work Order transaction record in NetSuite. A work order can be entered individually, or be automatically added to the work order creation queue based on inventory settings, as described below:

- Entering Individual Work Orders

  You can enter work orders for assemblies one at a time. They can be special order or production work orders. For more information, see Entering an Individual Work Order.

- Mass Creating Work Orders

  After an assembly item reaches its assigned build point, NetSuite adds a work order in the Mass Create Work Orders queue. The work order's suggested quantity restores the item's preferred stock level. For more information, see Mass Creating Work Orders.

  Warning: Automatically creating seven hundred plus special work orders can impact system processing.

The following is true for both types of work order forms. If you check the Mark Sub-Assemblies Phantom box, member items that are assemblies themselves are also built to complete the work order.

If you use the Work Orders and Demand Planning features, see Work Orders and Sub-Assemblies.

You can also create a work order for an assembly item when you add it to a sales order. When you select an assembly on a sales order, check the **Create WO** box. When the order is saved or approved, NetSuite adds a work order to the Mass Create Work Order queue. For more information, see Marking Assemblies to Create Work Orders. After work orders are entered, completing an assembly build for the work order closes the order.

Enabling the Work Orders Feature

An administrator can use the following procedure to enable the Work Orders feature.

To enable the Work Orders feature:

1. Go to Setup > Company > Enable Features.
2. Click the **Items and Inventory** subtab.
3. In the Inventory section, check the **Work Orders** box.

4. Click **Save**.

After the feature is enabled, you can set the Build Based On Commitment accounting preference. For more information, see the help topic Order Management Accounting Preferences.

Entering an Individual Work Order

Enter work orders to track the production of assembly items needed for stock or to fill open orders. A work order is a non-posting transaction.

Special Order work orders track assemblies for a particular sale. Production work orders track assemblies to increase stock. Both use the same work order form, but production work orders do not link to a sale transaction.

Work orders you enter list the members, or components, of the assembly item to be built.

 Manufacturing Assembly Work Orders

For information about work order statuses, see Work Order Statuses

To enter individual work orders:

Click one of the following links for instructions on entering individual work orders:

- Entering a Custom Work Order
- Entering a Standard Work Order
- Adding Custom Fields to Work Orders
- Production Start and End Dates

Note: When the Run Rate of previous operation is set to 0, the lag of current operation is also set to 0. This results in no production from the previous operation.

Entering a Custom Work Order

The following procedure describes how to enter a custom work order.

To enter a custom work order:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. Select the custom work order form.
3. If you use NetSuite OneWorld, select a subsidiary.
4. Enter a new, or accept the default **Date**.
5. The default **Status** is **Released**.
6. Check the **Firmed** box to firm the order.

   This box is checked by default for **Released** orders.
7. The **Order #** increases the largest work order number by one.
   a. To enter another order number, go to Setup > Company >Auto-Generated Numbers.
   b. On the **Transactions** subtab, next to **Work Order**, check the **Allow Override** box.
   c. Click **Save**.

      The next order number will revert to the standard pattern.

8. Select the **Assembly** you want to build.

   The assembly components appear on the **Items** subtab.

   > **Note:** After you associate an assembly build with this work order, you cannot change this field.

9. Check the **Mark Sub-Assemblies Phantom** box to build member assembly items to complete the work order.

   Clearing this box does not refresh or remove sub-assembly components on the **Items** subtab. To reload the BOM for a top level assembly, select a different assembly in the **Assembly** field. To reload a BOM for a phantom sub-assembly, change the item source for the sub-assembly to **Phantom**.

   > **Note:** After you associate an assembly build with this work order, you cannot change this field.

   For information about using the work order and demand planning, see Work Orders and Sub-Assemblies.

10. Optionally, check the **WIP** box to designate the work order to use WIP instead of a standard assembly build.

    You can select this setting only when the order status is **Released**. You cannot change this setting after a posting assembly transaction is logged against this work order. For information about using WIP, see Manufacturing Work In Process (WIP).

11. Select the related **Manufacturing Routing**.

    This list is available only when the **WIP** box is checked.

12. Check the **Auto-Calculate Lag** box to calculate lag times for operation tasks. For more information, see Operations Overlap

13. Enter the **Quantity** of assembly items you want to create. This can be a fractional number.

    If you enter a quantity higher than the available quantity, a warning message appears.

    The item's available quantity is calculated based on availability across all locations. Changing the header location does not affect the item availability used on the line.

    > **Tip:** You can customize the form to display item availability for each item across all locations. For more information, see the help topic Creating Custom Entry and Transaction Forms.

    > **Important:** After an assembly build is associated with this work order, note the following. The quantity can be changed only by closing the work order and then making a copy or creating a new work order. Closing the work order sets the **Back Order** amount to zero for the component items. However, it has no financial impact on the created assembly Item.
    >
    > To create a new work order to enter a new quantity:
    >
    > 1. View the work order, and then click **Close**.
    > 2. Click the **Make Copy** button.

14. Complete the remaining fields, as required.

Note: If you use Multi-Location Inventory, the selected location is the one that component inventory items are committed from.

Important: All items on one work order must be committed from the same location. Items can commit only from the location specified. This is true even if there are no available items at the specified location, and there are items available at another location.

15. Routing and Demand Planning generate supply work orders that enable you to select a **Scheduling Method**.

    NetSuite automatically populates the **Production Start Date** field when a work order transaction is initiated.

    When the final assembly is built and recorded in the work order transaction, NetSuite automatically populates the **Production End Date** field. For more information, see Production Start and End Dates.

Entering a Standard Work Order

The following procedure describes how to enter a standard work order.

To enter as standard work order:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. The **Order #** increases the largest work order number by one.
   a. To enter another order number, go to Setup > Company >Auto-Generated Numbers.
   b. On the **Transactions** subtab, next to **Work Order**, check the **Allow Override** box.
   c. Click **Save**.

      The next order number will revert to the standard pattern.
3. Select a **Customer** to associate this work order with.
4. Select the **Assembly** you need to build.

   After you select the item, the assembly components appear on the **Items** subtab.

   After you associate an assembly build with this work order, you cannot change this field.
5. NetSuite automatically populates the **Revision** based on the effective date.

   The selected assembly can disable this field.

   Note: If you use Advanced Bills of Materials, the **Revision** field is replaced by **Bill of Materials** and **Bill of Materials Revision**.
6. Check the **Mark Sub-Assemblies Phantom** box to build member assembly items to complete the work order.

   Clearing this box does not refresh or remove sub-assembly components on the **Items** subtab. To reload the BOM for a top level assembly, select a different assembly in the **Assembly** field. To reload a BOM for a phantom sub-assembly, change the item source for the sub-assembly to **Phantom**.

Note: After you associate an assembly build with this work order, you cannot change this field.

For information about using the work order and demand planning, see Work Orders and Sub-Assemblies.

7. Select the related **Manufacturing Routing**.

   This list is only available when the **WIP** box is checked.

8. Check the **Auto-Calculate Lag** box to calculate lag times for operation tasks. For information, see Operations Overlap

9. Enter the **Quantity** of assembly items you want to create. This can be a fractional number.

   If you enter a quantity higher than the available quantity, a warning message appears.

   The item's available quantity is calculated based on availability across all locations. Changing the header location does not affect the item availability used on the line

Tip: You can customize the form to display item availability for each item across all locations. For more information, see the help topic Creating Custom Entry and Transaction Forms.

Important: After an assembly build is associated with this work order, note the following. The quantity can be changed only by closing the work order and then making a copy or creating a new work order. Closing the work order sets the **Back Order** amount to zero for the component items. However, it has no financial impact on the created assembly Item.

To create a new work order to enter a new quantity:

1. View the work order, and then click **Close**.
2. Click the **Make Copy** button.

10. Enter a new, or accept the default **Date**.
11. The default **Status** is **Released**.

    Selecting the Planned status enables the Firmed box.

12. Check the **Firmed** box to firm the order.

    This box is checked by default for **Released** orders.

13. Complete the remaining fields, as required.

    Routing and Demand Planning generate supply work orders that enable you to select a **Scheduling Method**. In the **Production Start Date** field, enter the date you expect to begin assembly production. When you use Demand Planning, the component demand is based on the production start date.

    In the **Production End Date** field, enter the date you expect to complete assembly production.

    This field defaults to show the transaction date plus lead time.

14. In the Classification section, complete the fields, as required. If you use NetSuite OneWorld, you must select a subsidiary to associate with this work order.

    If you use Multi-Location Inventory, the selected location is the one that component inventory items are committed from.

> **Note:** All items on one work order must be committed from the same location. Items can commit only from the location specified. This is true even if there are no available items at the specified location, and there are items available at another location.

The **Built** field displays the total number of assemblies that have been completed on associated assembly builds.

This field appears only after the form is saved.

15. On the **Items** subtab, complete the following steps:
    a. Select an **Item** from the list.

       When you select an assembly, the assembly components appear on the **Items** subtab.

       If the assembly includes members that are assemblies and you checked the **Mark Sub-Assemblies Phantom** box, note the following. The sub-assemblies and sub-assembly components are indented based on their level in the assembly hierarchy.

       - The **Quantity** field shows the amount of the item required for this work order.

         You can edit component quantities until a build is associated with the work order.

         If you use Multiple Units of Measure, the quantity for members of an assembly item is always defined in base units on work orders.
       - The **Units** field displays the base units of the component used in the parent assembly.
       - The **Description** field displays the item description as recorded on the item record.

    b. Select the serial or lot numbers of items to commit those items to be used to complete this work order.
       - The **Commit** field displays whether the available quantity is committed on this order. Commitment occurs only when the full quantity is available. Otherwise, commitment is indefinitely deferred.
       - The **Options** field displays any custom options associated with the item.

    c. Select the **Purchase Order** option in the **Item Source** list to create a special order purchase order for a component or sub-assembly.

       > **Note:** You must identify a preferred vendor and a purchase price on an item record for that item to be selected as a special order. For more information, see the help topic Identifying Special Orders.

    d. Select the **Work Order** option in the **Item Source** list to create a special order work order for a component or sub-assembly.

    e. Click the arrows below to view steps for each subtab.
16. If you use the Outsourced Manufacturing feature, click the **Outsourcing** subtab and then complete the fields, as required. For more information, see Outsourced Manufacturing.
17. Click the **Relationships** subtab, and then follow the steps below, as required.
    a. Check the **Update Customer** box to update the sales team on the customer's record with changes made.
    b. Select a **Partner** and partner role, if necessary.
    c. Check the box in the **Primary** column if this partner is the lead.
    d. In the **Contribution %** column, enter the contribution percentage for each team member.
    e. Click **Add**.
18. If you use Team Selling, click the **Sales Team** subtab, and then complete the following steps, as required.

a. Select the sales team responsible for this sale.

   The members of the sales team appear below. You can edit each team member's sales role and contribution for this transaction or add team members, if needed.

b. Select the sales team responsible for this sale.

   The members of the sales team appear below. You can edit each team member's sales role and contribution for this transaction or add team members, if needed.

c. In the **Choose Team** field, select a sales team to associate with this transaction. To create a sales team, go to Lists > Relationships > New > Select Sales Team Members.

d. Check the **Update Customer** box if you want to update the sales team on the customer's record with changes you make here.

e. Select an **Employee** and **Sales Role** if necessary.

f. Check the box in the **Primary** column if this employee is the lead.

g. In the **Contribution %** column, enter the contribution percentage for each team member.

h. Click **Add**.

19. Click the **Communication** subtab, and then complete the following steps, as required.

    a. On the **Events** subtab, enter events.

    b. On the **Tasks** subtab, view or enter CRM tasks records.

       For information about tasks, see the help topic Working with CRM Tasks.

    c. On the **Phone Calls** subtab, view or enter new phone calls.

    d. On the **Files** subtab, you can select and add files from the File Cabinet that are associated with this contact.

       Select **-New-** to upload a new file to the File Cabinet.

    e. On the **User Notes** subtab, add and track notations.

20. Click **Save**.

After the work order is recorded, you can enter an assembly build against the order to close it.

Adding Custom Fields to Work Orders

The following procedure provides details to adding custom fields to the Work Order page.

To add a custom field to the Work Order page:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. Click **Customize** on the top right of the page:
   - For a custom body field, click **New Body Field**.
   - For a custom column field, click **New Column Field**.
3. On the Transaction Column Field page, enter a **Label** for the new field:
   - For body fields, this label is displayed next to the field on transactions.
   - For column fields, this name appears as a column heading on transactions.
4. On the **Applies To** subtab, check the box next to transactions you want the field to appear on:
   - For body fields, check the **Work Order / Assembly Build** box.
   - For column fields, check the **Work Order** box.

5. Click **Save**.

   The custom field appears on your work order form.

Production Start and End Dates

NetSuite automatically calculates Production Dates by default based on related work order transactions. This includes Assembly Builds for Standard Work Orders and Issue Components and Work Order Completions for WIP Work Orders. This functionality enables you to track production dates to help assess production plans, identify problems, and optimize production.

NetSuite starts calculating production when the first build transaction is initiated or, if WIP is enabled, the date components have been issued. The system end date is recorded when the work order is closed. The end date must occur on the same day or some time after the start date. You cannot record an end date if you have not entered a start date.

For example, you start to build mountain bikes for an assembly build. The work order displays both the production start and end dates as January 16. The work order instructions require that 10 bicycles be built. On January 15, two bicycles were built in your facility, so the system records the Start Date as January 15. However the other eight bicycles are assembled earlier, on January 10. NetSuite automatically adjusts the work order Start Date as January 10 and the End Date to January 15.

Automation logic always uses transaction dates. In the preceding example, the system used the dates from the assembly builds for these non-WIP work orders. However, NetSuite lets you manually change start and end dates.

Overriding Production Dates

The following procedure describes how to manually change production dates.

To override a production date:

1. On the work order, below the **Production Start** or **End Date**, click **Enter Manually**.
2. Select a new date from the calendar.

   For example, you can change the date from Dec. 2 to Dec. 3.
3. Click **Save**.

Disabling Production Dates

If you prefer to control production dates manually, and do not want NetSuite to calculate production dates, you can disable this functionality. However, you must enter production dates manually on each work order.

To disable production dates:

1. Go to Setup > Manufacturing > Manufacturing Preferences.
2. In the **Production Execution** section, clear the **Automatically Fill Production Start and End Dates** box.
3. Click **Save**.

   When you create a work order, the **Production Start Date** is editable.

When you enter an **Production Start Date**, the **Production End Date** is editable.

Mass Creating Work Orders

You enter work orders to track the production of assembly items needed either for stock or to fill orders. The work order lists the members, or components, of the assembly item to be built. A work order is a non-posting transaction.

Some work orders in the queue are not intended for a particular sale. Production work orders are generated when the back ordered quantity of an assembly reaches its assigned build point. After the build point is reached, a work order is added in the Mass Create Work Orders queue.

For each work order, a bill of materials (BOM) is generated to facilitate picking member items for the build. When this work order completes, the regular stock level of the assembly is increased and the finished goods are committed to open sales orders.

Special Order work orders track assemblies for a particular sale. Production work orders track assemblies to increase stock. Both use the same work order form, but production work orders do not link to a sale transaction.

After work orders are entered, completing an assembly build for the work order closes the order.

For information about entering individual work orders, see Entering an Individual Work Order.

To mass create work orders:

1. Go to Transactions > Manufacturing > Mass Create Work Orders.
2. Select a **Location** to show only work orders for that location. Select **All** to show work orders for all locations.

   If you use Multi-Location Inventory, the location selected is the one that component inventory items are committed from.

   Note: All items on one work order must be committed from the same location. Items can commit only from the location specified. This is true even if there are no available items at the specified location, and there are items available at another location.
3. Select a **Department** or **Class** if you track them. The selected department or class appears on the assembly build.
4. Select a **Parent Item** to show only child items for that parent.
5. Enter a **Minimum Quantity** to filter the list by the minimum set on the item record.
6. Complete the fields on the **Time Phased Items** subtab.

   The **Time Phased Items** subtab displays a list of items that need to be ordered based on time-phased replenishment.

   Note: To use these enhancements for time-phased planned items, the Demand Planning feature must be enabled.

   a. Check the box in the **Order** column next to each item you want to create a work order for.
   b. Select an **Order Date**.
   c. Select a **Production End Date**.
   d. Check the box next to each item to order.

Click the **Mark All** button to check all boxes or click the **Unmark All** button to clear all boxes.

e. Accept the suggested **Quantity** or enter a new amount.

> **Note:** When you use Demand Planning, see the help topic Demand Planning on Item Records for information about suggested quantities.

When you use Multiple Units of Measure, the quantity for members of an assembly item is always defined in base units on work orders.

f. Check the **Mark Sub-Assemblies Phantom** box to treat the sub-assemblies within the selected assembly as phantoms. The sub-assembly components are included in the assembly work order that is generated.

For information about work orders and demand planning, see, Work Orders and Sub-Assemblies.

7. Click the **Reorder Point Items** subtab.

The **Reorder Point Items** subtab displays a list of items that need to be ordered based on designated reorder point. These items have a quantity available that is less than the reorder point indicated on the item record.

> **Note:** To use these enhancements for time-phased planned items, the Demand Planning feature must be enabled.

a. Check the box in the **Order** column next to items you want to order.

Click the **Mark All** button to check all boxes or click the **Unmark All** button to clear all boxes.

b. Accept the suggested amount to order in the **Quantity** column, or enter a new quantity.

The suggested NetSuite order calculation is: (preferred stock level + quantity needed) less (quantity available + quantity on order).

c. If you use Make Departments required and Allow Per-Line Departments, select a **Department**. Departments are used for the corresponding line items on generated purchase orders. For more information, see the help topic Using Per-Line Classifications.

d. Check the **Mark Sub-Assemblies Phantom** box to mark an individual sub-assembly as a phantom assembly. A phantom assembly is typically a non-stocked assembly that groups together material needed to produce a subassembly. The Phantom BOM option lets you define the item source for the subassembly on a line-by-line basis.

If you use the Work Orders and Demand Planning features, see Work Orders and Sub-Assemblies.

8. Click **Submit**.

Work Orders are generated for the items you have indicated. Work orders generated for assembly items that use the Reorder Point replenishment method use Forward Scheduling. This is true regardless of the default scheduling method set in the account preferences. For more information, see Production Scheduling Methods Overview.

Marking Assemblies to Create Work Orders

When you use the Work Orders feature, you can create work orders for assembly items from sales orders. You can tag items to create work orders in two ways. You can mark the item when you create the sales

order, or you can tag the item record. For more information, see Creating Work Orders From a Sales Orders and Creating Work Orders From Item Records.

Creating Work Orders From a Sales Orders

You can tag items to create work orders when you enter a sales transaction by checking the box in the **Create WO** column. Then, when you save or approve the order, NetSuite creates a work order that is linked to the sale.

To create a work order from the sales order:

1. Go to Transactions > Sales > Enter Sales Orders.
2. Enter information in the transaction header as needed.

   Required fields display a red asterisk (*****).
3. In the **Item** field, select an assembly item.
4. Check the box in the **Create WO** column.
5. Enter additional information as needed for this line item.
6. Click **Add**.
7. Click **Save**.

Creating Work Orders From Item Records

You can set an assembly item to default to create a work order by tagging the item record. Then, when the item is selected on a sales order, the box in the Create WO column is automatically checked.

To set an assembly item to default to create a work order:

1. Go to Lists > Accounting > Items.
2. In the **Type** field, select **Assembly** to filter your item list to show assembly items.
3. Click **Edit** next to the item.

   Only assembly item records can be set up to default to create work orders.
4. On the **Purchasing/Inventory** subtab of the assembly item record, check the **Special Work Order Item** box.
5. Click **Save**.

Planned Work Orders

You can enter work orders that have a status of Planned. A planned work order operates as follows:

- Includes component information
- Includes resource information
- Does not commit items until the work order is released

Planned work orders can be either Open or Firmed.

- **Open** – Open planned work orders are deleted before supply planning runs.
- **Firmed** – Firmed planned work orders are **not** deleted before supply planning runs. For more information, see Marking Work Orders Firmed.

You can manually create planned work orders, or you can have the NetSuite supply planning process generated the planned work orders. For more information, see Manually Entering Planned Work Orders and Automatically Generating Planned Work Orders.

Manually Entering Planned Work Orders

The following procedure explains how to manually enter planned work orders.

To manually enter planned work orders:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. In the **Status** field, select **Planned**.
3. Complete additional fields on the form as necessary.
4. Click **Save**.

Automatically Generating Planned Work Orders

Set preferences for the NetSuite planning process to generate planned work orders. When you let NetSuite generate planned work orders, you can see the resources and materials required immediately after a planning process run.

To set up preferences:

1. Go to Setup > Manufacturing > Manufacturing Preferences.
2. To define the default for supply planning work orders, select a **Create Work Orders in Supply Planning** option:
   - **Do Not Generate**
   - **Generate in Firm Planned Status**
   - **Generate in Open Planned Status**
   - **Generate in Released Status**

   Your selection defines the default status of new work orders generated by a planning process run.

   > **Note:** If you **generate orders** and also use the Manufacturing Routing and Demand Planning features, you can define production scheduling methods on work orders. For more information, see Production Scheduling Methods Overview and Supply Planning and Routing.

3. In the **Default Work Order Status** field, choose one of the following:
   - **Firm Planned**
   - **Open Planned**

- **Released**

Your selection defines the default status of new work orders you manually create.

4. Click **Save**.

Marking Work Orders Firmed

You must change the status of Open to Firmed for the order to be saved and processed when the supply planning process runs. You can open an individual order and set it to Firm. You can also use the steps below to update the status of many orders at one time.

To mark work orders firmed:

1. Go to Transactions > Manufacturing > Mark Work Orders Firmed.
2. In the **Item** field, select an item to filter the list and show only orders that include that item.
3. In the **Customer** field, select a customer to filter the list and show only orders for that customer.
4. Check the box in the **Mark Firmed** column next to each order you want to firm.
5. Click **Submit**.

Marking Work Orders Released

Any work order in a Firm Planned state must be set to the Released status to be able to commit items to it. You can open an individual order and set it to released. You can also use the steps below to update the status of many orders at one time.

To mark work orders released:

1. Go to Transactions > Manufacturing > Mark Work Orders Released.
2. In the **Item** field, select an item to filter the list and show only orders that include that item.
3. In the **Customer** field, select a customer to filter the list and show only orders for that customer.
4. Check the box in the **Mark Released** column next to each order you want to firm.
5. Click **Submit**.

Component Yield Preferences

Assembly Component preferences can help you with component requirement calculations. To use these component preferences, enable the Work Orders feature and adjust your item records settings that are available on the following:

- **Use Component Yield** – Account for material component yield loss during the ordering and planning process
- **Round Up Quantity as Component** – Round the component quantity up in the units used on work order

Setting the Use Component Yield Preference

The Use Component Yield preference lets you automatically calculate quantity allowances for expected raw material loss during processing. You no longer need to manually adjust raw material purchase quantities to account for issues. For example, quality of material/defects or machine processing/scrap.

Accounting for material variances lets you adjust your planned usable quantity by ordering more units than the target build quantity. Work orders can reflect item order quantities based on accurate expected component yield assumptions, not the quantities listed on the bill of materials.

For example, you sell a coffee cup assembly that is made up of 3 components: 1 cup, 1 lid and 1 sleeve. Every 100 assemblies produces 5 defective cups. Therefore, when ordering the cup assembly you must order 105 units to produce 100 cups.

To set the Use Component Yield preference:

1. Create a new BOM record.

   For more information, see Creating a New BOM Record.
2. To enable NetSuite to calculate the necessary quantity to build or order based on component yield settings, in the Bill of Materials page, check the **Use Component Yield** box.

   You can find the Use Component Yield in the Bill of Material form. To learn more, see

   Creating a New BOM Record.

   NetSuite applies this option to the assembly and any sub-assembly components required for the top level assembly. For more information, see Example Three: Sub-assemblies and Component Yield.

   > **Important:** Review your customization scripts prior to checking this box.

   To prevent NetSuite from calculating the necessary quantity to build/order, clear the **Use Component Yield** box.
3. If you check the **Use Component Yield** box, you can set the following on the item record:
   - The **Quantity** field on the **Components** subtab is disabled because this quantity is calculated by NetSuite.

     This field displays the amount required for the assembly when one unit of the assembly is being built. This value is automatically calculated from the entries in the **Component Yield** and **BOM Quantity** fields.
   - The **BOM Quantity** column displays the quantity of the component used to build an item assuming no loss.
   - The **Component Yield** column displays the anticipated yield due to loss during the manufacturing process.

   For example, a Sleeve is a component of the Coffee Cup assembly. Each Coffee Cup assembly requires a sleeve. The sleeve has an anticipated loss amount of 50%. Enter the following on the Coffee Cup assembly item record:

   - Check the **Use Component Yield** box
   - Sleeve Component Yield is 50%
   - Widget 1 BOM Quantity is 1

   When a work order is created for the Coffee Cup item, NetSuite calculates a requirement of 2 sleeves. NetSuite displays 2 in the **Quantity** field on the **Components** subtab.

Setting the Round Up Quantity as Component Preference

Use the Round Up Quantity as Component Preference on a work order component quantity to round up in the units used on work order. Depending on your settings, the component yield calculation could result in a fractional quantity.

For example, a mountain bike assembly requires 2 units of the brake component. The component yield is 99%. To build 5 of these assemblies requires 10.1 units of the brake component. Because you can consume components only in whole numbers, you cannot consume 10.1 units. You need to round up to the next highest unit. For example, 11 brake component units.

On a work order for an assembly that uses component yield, NetSuite indicates the Component Quantity, BOM Quantity and Component yield for rounded-up components.

To set the Round Up Quantity as Component preference:

1. Create or edit an item record for an Inventory item or an Assembly item that is used as a sub-assembly component.
2. In the **Purchasing/Inventory** subtab **Inventory Management** section, do one of the following:
   - To enable NetSuite to round up the quantity consumed for this item, check the **Round Up Quantity as Component** box.
   - To prevent NetSuite from rounding up the quantity consumed for this item, clear this box.

When you check this option, the **Quantity** field on the **Components** subtab is disabled because this quantity is calculated by NetSuite.

Important: Review your customization scripts before checking this box.

Component Yield Examples

The following table displays the Table Assembly item and its components:

Level 1	Level 2	Level 3
Table (1)		
	Table Top (1)	
	Leg Assembly (2)	Rod (1)
		Filler (1)

Example One: Assembly without Component Yield

Each table assembly you manufacture requires 1 table top and 4 legs. For each leg, you require 1 rod and 1 filler. The Build Subassembly box is checked on the Table Top Assembly item record. When a work order for a table top assembly is created, 4 rods and 4 fillers are required.

Example Two: Assembly with Component Yield

The item Table Assembly item record Use Component Yield box is checked.

Ten percent of the leg subassemblies are processed incorrectly and are waste. When a work order is created for 100 table assemblies, NetSuite calculates that the order requires 110 rods and 110 fillers.

Example Three: Sub-assemblies and Component Yield

When a work order is created for an assembly, the top level assembly component yield option applies to all sub-level components.

Example 3a:

- Table assembly does not use component yield
- Leg subassembly uses component yield

The item Table Assembly and the item record Use Component Yield box is not checked.

After a work order is created for 100 Table Assemblies, NetSuite follows the component yield option for the top level assembly and sub-level components.

Because component yield is not used for the top level, NetSuite does not use component yield for the subassembly. The work order displays a requirement of 100 rods and 100 fillers.

Example 3b:

- Table assembly uses component yield
- Leg sub-assembly does not use component yield

After the Build Subassembly box is checked, NetSuite performs a yield calculation for all subassembly components.

Item A ▪ Uses component yield		
	Item B ▪ Does not use component yield ▪ is a component of A	
		Item C ▪ is a component of B
		Item D ▪ is a component of B

A work order for Item A is created and the Build Subassembly box is checked. NetSuite uses component yield for all subassemblies (C and D) because it respects the setting of the top level assembly.

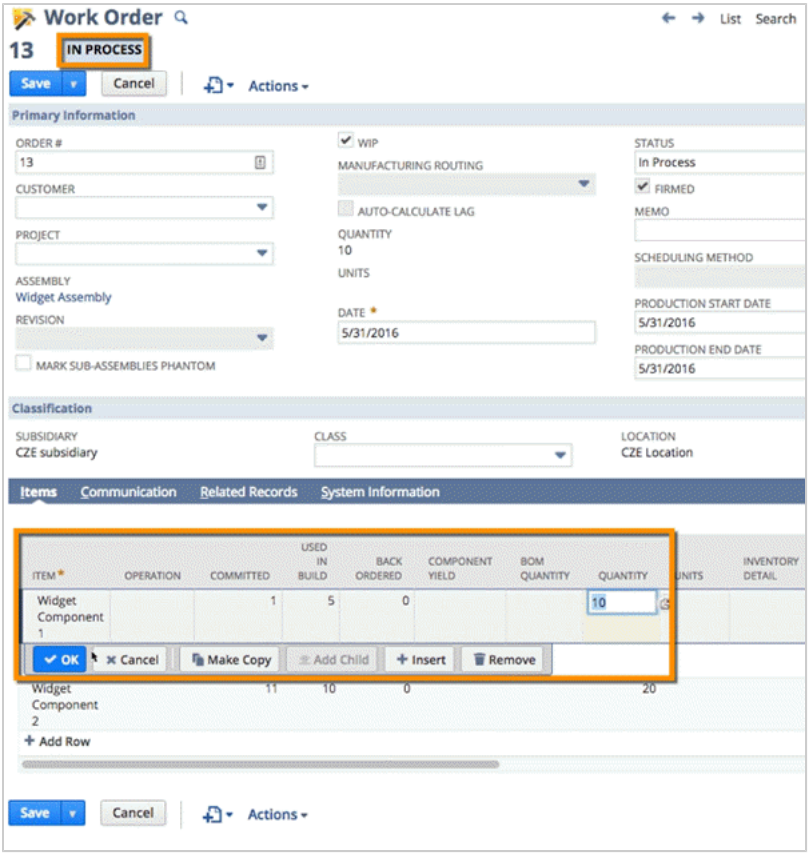
Editing a Work Order

You can add and edit components on any work order which is in Planned, In Process or Released state. You can also remove components from a Work Order if they have not already been used in the build. In such cases, amend the associated Work Order Issue or Work Order Completion, before attempting to

remove the item from the work order. The quantity of components cannot be changed to a number less than the quantity used in a build.

To edit individual work orders:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Beside a work order that is in **In Process** or **Released** status, click **Edit**.
3. In the **Item** subtab, select the item you want to edit.
   - Click **Cancel** to delete any changes you made and return to the previous item configuration.
   - To reuse the existing item details to create a new item, click **Make Copy**.
   - Click **Insert** to add another item.
   - Click **Remove** to delete the item information.



4. Click **Save**.

Note: If you use Advanced Manufacturing, you can track updates to your work order. For more information, see the help topic Editing Work Orders for Scheduling.

Printing a Work Order Bill of Materials

For work orders you have entered, you can print a Bill of Materials (BOM). The BOM shows the types and quantities of items you need to complete the work order.

Following are the two ways to print a BOM.

Print from the work order:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Click **View** next to the work order.
3. On the work order, click **Print BOM**.

   Only information from the header of the work order appears in the BOM. If you want to print assembly details of the work order, you must open the assembly item record and click **Print**.

Print from the print queue:

1. Go to Transactions > Management > Print Checks and Forms.
2. Click **Bill of Materials**.
3. In the **Filter By** field, choose one of the following to filter the work orders shown:
   - **Some Items Committed** – The list shows orders that have one or more items committed to be built.
   - **All Items Committed** – The list shows orders that have all items committed to be built.
   - **Ignore Item Availability** – The list shows all open orders regardless of the availability.
4. Select a location to filter the list for orders for that location.
5. Select a form to use for this print run.

   This field defaults to the preferred form, but you can choose a form you have previously customized.

   If you are printing packing slips and use the Advanced Shipping feature, you can also use a custom invoice form when printing packing slips. For example, you can customize an invoice form to show the item rate and amount, and the order total. Then, when you print the packing slip using the custom form, the packing slip shows the additional information.

   To customize a form, go to Customization > Forms > Transaction Forms. Click **Customize** next to the appropriate form.
6. The **Documents in Queue** field shows the number of forms you have selected to print. This field updates as you check bills of materials to print.
7. Check the **Allow Reprinting** box to reprint previously printed transactions.

   When you check this box, all documents appear at the bottom of the page in segments. Clear this box to allow documents to be printed only one time.

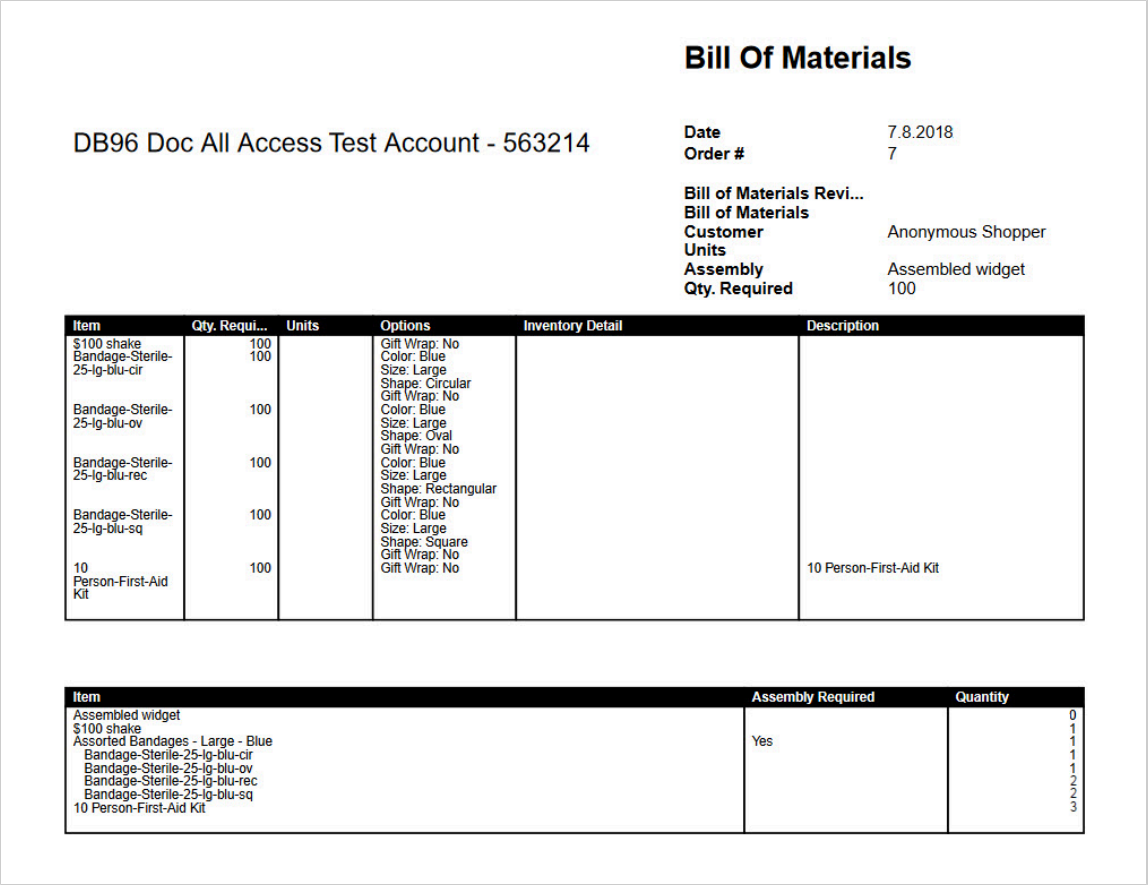
   > **Note:** The work order tracks whether a bill of materials has been printed. It resets this flag whenever components are committed so that new top-level assemblies may be built.
8. Click the **Select Order Number** field to enter or scan in transaction bar codes.
9. Check the box in the **Print** column next to each order you want to print a bill of materials for.
10. Click **Print**.

The bill of materials prints in two sections:

- **Section One: Bill of Materials**

  This section is a complete list of all items needed to complete the build for the work order. It shows the specific items and the quantity needed for each, including components of assembly members.
- **Section Two: Assembly Hierarchy**

This section shows how many of each component are needed for each unit.



Bill Of Materials

DB96 Doc All Access Test Account - 563214

Date	7.8.2018
Order #	7
Bill of Materials Revi...	
Bill of Materials	
Customer	Anonymous Shopper
Units	
Assembly	Assembled widget
Qty. Required	100

Item	Qty. Requi...	Units	Options	Inventory Detail	Description
$100 shake	100		Gift Wrap: No		
Bandage-Sterile-25-lg-blu-cir	100		Color: Blue Size: Large Shape: Circular Gift Wrap: No		
Bandage-Sterile-25-lg-blu-ov	100		Color: Blue Size: Large Shape: Oval Gift Wrap: No		
Bandage-Sterile-25-lg-blu-rec	100		Color: Blue Size: Large Shape: Rectangular Gift Wrap: No		
Bandage-Sterile-25-lg-blu-sq	100		Color: Blue Size: Large Shape: Square Gift Wrap: No		
10 Person-First-Aid Kit	100		Gift Wrap: No		10 Person-First-Aid Kit

Item	Assembly Required	Quantity
Assembled widget		0
$100 shake		1
Assorted Bandages - Large - Blue	Yes	1
Bandage-Sterile-25-lg-blu-cir		1
Bandage-Sterile-25-lg-blu-ov		1
Bandage-Sterile-25-lg-blu-rec		2
Bandage-Sterile-25-lg-blu-sq		2
10 Person-First-Aid Kit		3

Print Instructions with the Bill of Materials

If you print your BOM in PDF format, you can append the PDF file to print additional materials with the BOM. For example, you can print a diagram or instructions about the assembly process for the top level assembly item. For more information, see Appending a PDF File to Print with the Bill of Materials.

An alternative way to view and print the BOM is by using the Bill of Materials Inquiry.

Appending a PDF File to Print with the Bill of Materials

If you print your bills of materials (BOM) in PDF format, you can append the PDF file to print additional materials with the BOM. Thiese additional materials are for use when picking and assembling the item. For example, you can print a diagram or instructions about the assembly process for the top level assembly item.

To append a file to a bill of materials:

1. Go to Lists > Accounting > Items.

2. In the **Type** field, select **Assembly** to filter your item list to show assembly items.
3. Click **Edit** next to the assembly item.
4. Click the **Communication** subtab of the item record.
5. In the **Attach File** field, attach the PDF file that contains the diagram, instructions, or other information you want to print with the BOM.
6. Check the **Print with BOM** box.

   The printed file is in PDF format and the contents of the PDF file are appended to printed BOMs for this assembly item.
7. Click **Add**.
8. Click **Save**.

Building Work Orders

To close a work order, you must complete a build that assembles the necessary items.

To build work orders:

1. Go to Transactions > Manufacturing > Build Work Orders.
2. Select an assembly **Item** to filter the list and show only work orders for the item.
3. Select a **Customer** to filter the list for work orders associated with that customer.

   Select **All** to display all work orders.
4. Select the **Posting Period** you want to post this transaction to. If a period is closed, you cannot post to that period.
5. By default, NetSuite inserts today's **Date** as the transaction date. You can enter another date, or click the calendar icon to select another date.
6. Select the **Bulk Build From Location** use to build the orders.
7. Check the **Filter** box to filter the list to show only orders associated with the location selected in **Bulk Fulfill From Location**.

   Clear this box to build orders associated with any location or associated with no location.
8. In the **Filter By** field, choose one of the following work order filters:
   - **Some Items Committed** – Display orders with one or more items committed to be built
   - **All Items Committed** – Displays orders with all items committed to be built
   - **Ignore Item Availability** – Displays all open orders
9. Click the **Select Order Number** field to enter or scan in transaction bar codes.
10. Check **Build** box beside each order you want to build.
11. Click **Submit**.

An assembly build is recorded for each of the work orders.

Work Orders and Demand Planning

When you use the Work Orders and Demand Planning features, you can create work orders to replenish stock, based on demand for assembly items. These work orders use information from item records to calculate lead times for orders.

Lead Time for Supply Planning

When you use the Work Orders and Demand Planning features, assembly item records show the **Work Order Lead Time** field.

In the **Work Order Lead Time** field, enter the lead time (in days) to build one assembly in the base unit. Then, NetSuite calculates the lead time for a work order using the following:

Lead time for a work order=

Work Order Lead Time on Item Record * Quantity in base unit of measure

Work Order Start and End Dates

When you use Demand Planning, if either the start date or end date is left blank, it can be calculated in the following way:

- When an **End Date** is entered but the **Start Date** is blank, the start date is calculated as follows:

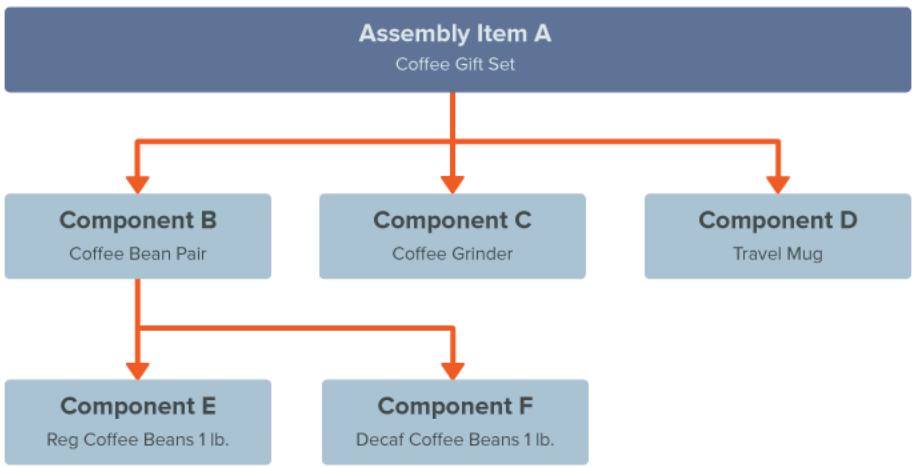
  Start Date = End Date - (Work Order Lead Time from the item record * Quantity in base unit of measure)
- When a **Start Date** is entered but the **End Date** is blank, the end date is calculated as follows:

  End Date = Start Date + (Work Order Lead Time from the Item Record * Quantity in base unit of measure)

Note: The natural rounding method is used to determine the start and end date of work orders.

Work Orders and Sub-Assemblies

When you generate a new supply plan for an assembly item, it calculates material requirements based on the lowest level of component items needed. This is true for assembly items that have the **Mark Sub-Assemblies Phantom** box checked on the item record. For example, the following diagram depicts the Coffee Gift Set assembly item and has the following component structure.



- Assembly Item A: Coffee Gift Set
  - Component B: Coffee Bean Pair
    - Component E: Bag of Regular Beans, 1 lb.
    - Component F: Bag of Decaf Beans, 1 lb.
  - Component C: Coffee Grinder
  - Component D: Travel Mug

The **Mark Sub-assemblies Phantom** box is checked on the item record for Item A: Coffee Gift Set. When a planned work order is generated for a Coffee Gift Set, the component assembly requirements are for items E, F, C and D. And, the purchase order created shows these items. Notice that Item B: Coffee Bean Pair is not a requirement itself, only its member components are required.

Also, the Mass Create Work Order page displays the lines from the supply plan with the Mark Sub-assemblies Phantom box disabled.

By contrast, the **Mark Sub-assemblies Phantom** box is clear on the item record for Item A: Coffee Gift Set. The work order is created only for items B, C, and D. If B is not available, NetSuite does not create a work order.

Advanced Bill of Materials

A Bill of Materials (BOM) lists the quantities of raw materials, assemblies, sub-components, and parts you need to manufacture a product. A BOM can be used to communicate between manufacturing partners, multiple facilities within the organization, or with a single manufacturing plant.

Note: After your administrator enables the Advanced Bill of Materials feature, the Advanced BOM record replaces the Assembly/Bill of Materials record. When you use Advanced BOM, any existing BOM is automatically converted to a read-only legacy BOM record.

Advanced BOM enables you to do the following:

- Copy existing BOMs and create new BOMs
- Use a single BOM across multiple assemblies

  For example, multiple bicycle frame sizes could all use the same wheel assembly BOM.
- Assign multiple BOMs to a single assembly
- Apply unique BOMs to various stages of the product lifecycle

  For example, an engineering BOM, a production BOM, and a subcontracting BOM.
- Copy existing Manufacturing Routings and create new routings
- Designate a default BOM for an assembly, or select an assembly default BOM for a location

  For example, a bicycle assembly produced in Canada uses BOM CA. When the company starts producing the same bicycle in the U.S., the system uses BOM U.S.
- Define yield at the component level on the BOM revision record

  Component yield enables you to account for material component loss during ordering and planning.
- Create multiple revisions of a BOM with different effective start and end dates

Enabling Advanced BOM

An administrator must use the following procedure to enable the Advanced Bill of Materials (BOM) feature.

Important: Bill of Materials impacts many areas within NetSuite. Before making Advanced BOM available to your organization, test it in your sandbox or release preview account. Any company customizations and third party integrations could also be affected.

To enable advanced BOM:

1. Go to Setup > Company > Enable Features.
2. Click the **Inventory & Items** subtab.
3. In the **Inventory** section, check the **Advanced Bill of Materials** box.
4. In the warning box, click **OK**.
5. Click **Save**.

Multiple BOM revisions are created for assemblies that were using BOM revision control. For more information, see the help topic Revision Control BOM Management. These revisions appear on the BOM record revisions subtab.

Important: If you disable Advanced BOM after using it, NetSuite deletes any BOM and BOM revision records you created when Advanced BOM was enabled. NetSuite saves only legacy BOMs.

Viewing Legacy BOM Records

After an administrator enables the Advanced BOM feature enabled, NetSuite automatically converts existing BOMs to read-only legacy BOM records. A legacy BOM is a snapshot of an assembly and its components at the time of conversion. The legacy BOM contains a link to the assembly record.

Advanced BOM also links existing routings to corresponding legacy BOMs. NetSuite saves a copy of the link between the routing and the assembly in the event Advanced BOM is disabled. If Advanced BOM is disabled, the routing is linked to the assembly record.

After Advanced BOM is enabled, the **Assembly/Bill of Materials** label changes to **Assembly** on the New Item, Assembly Item, and Saved Search forms. In addition, the **Derived from Member Items Cost Estimate Type** is no longer available for Assembly Items.

To view a legacy BOM:

1. Go to Lists > Supply Chain > Bill of Materials.
2. Beside the item you want to display, click **View**.
   - To view Bill of Materials – click the link under the **Legacy BOM for Assembly**.
   - To view BOM Revision details – on the **Revisions** subtab, click the revision **Name**.

Legacy BOM records should be used as back up records only. To modify a legacy BOM record, create a copy of the legacy BOM. For more information, see Copying a BOM Record.

Enabling Legacy BOM Editing

Some manufacturing customers want to use Advanced BOM, but do not want to copy Legacy BOMs. These customers can enable legacy BOM editing.

To enable legacy BOM editing:

1. Go to Setup > Manufacturing > Manufacturing Preferences.
2. In the Product Definition section, check the **Allow Editing of Legacy BOMs** box,
3. Click **I Agree**.

   After you click **Agree**, you cannot disable the Advanced BOM feature. It is important to test this feature in your sandbox account before enabling it in your production account.
4. Click **Save**.

Create a BOM

Creating Advanced Bills of Materials and BOM Revisions

You can create a BOM using one of the following methods:

Creating a New BOM Record

The following procedure describes how to create a new BOM record.

To create a new BOM record:

1. Go to Lists > Supply Chain > Bills of Materials > New.
2. Enter a unique and descriptive BOM **Name**.
3. In the **Memo** field, enter any information you want to include with this BOM.

   For example, include phase labeling.
4. To apply component yield to all BOM revisions, check the **Use Component Yield** box.

   For more information, see Component Yield Preferences.
5. To allow all assemblies to use this BOM, check the **Available for All Assemblies** box.

   Clear the box to limit BOM use to only the assemblies selected in the **Restrict to Assemblies** field.

   > **Note:** Selecting an assembly from the **Restrict to Assemblies** field does not create a link between the BOM and the assembly.
6. To permit all locations to use this BOM, check the **Available for All Locations** box.

   Clear this box to limit BOM use to the locations selected in the **Restrict to Locations** field.
7. Check the **Inactive** box if you do not want this BOM to appear in search lists on records and forms.

   Clear this box if you want this BOM to appear in lists.
8. If you use NetSuite OneWorld, select the **Subsidiary** this BOM is available for. Subsidiary is inherited by BOM revisions.

   Press and hold CTRL to select multiple subsidiaries.
9. To make the BOM available for all subsidiaries of the selected parent, check the **Include Children** box.

   If checked, the read-only **Used on Assembly** box indicates that the BOM is associated to an assembly.
10. Click **Save**.

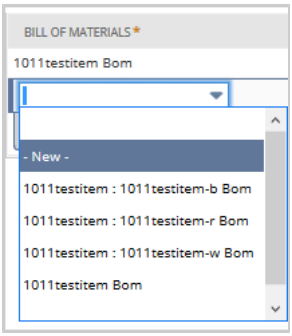
Creating a BOM From an Assembly

The following procedure describes how to create a BOM from an assembly.

To create a BOM from an assembly:

1. To create a new assembly or use an existing assembly, go to Lists > Accounting > Items.

2. Beside the assembly you want to create a BOM for, click **Edit**.
3. Click the **Manufacturing** subtab.
4. In the **Bill of Materials** list, click **New**.



5. Complete the **Bill of Materials** window.
6. Click **Save**.

Copying a BOM Record

Copying a BOM enables you to reuse existing (legacy) work to create a new BOM. The following are reasons you might want to copy a BOM:

- Create a new BOM to use the same current and future revisions
- Create alternate BOMs with minor component changes for the same product
- Update a product version with component updates

To copy a BOM:

1. Go to Lists > Supply Chain > Bill of Materials.
2. Beside the BOM you want to copy, click **View**.
3. Click **Actions** and then click **Make Copy**.
4. Change the copied Bill of Materials **Name**.

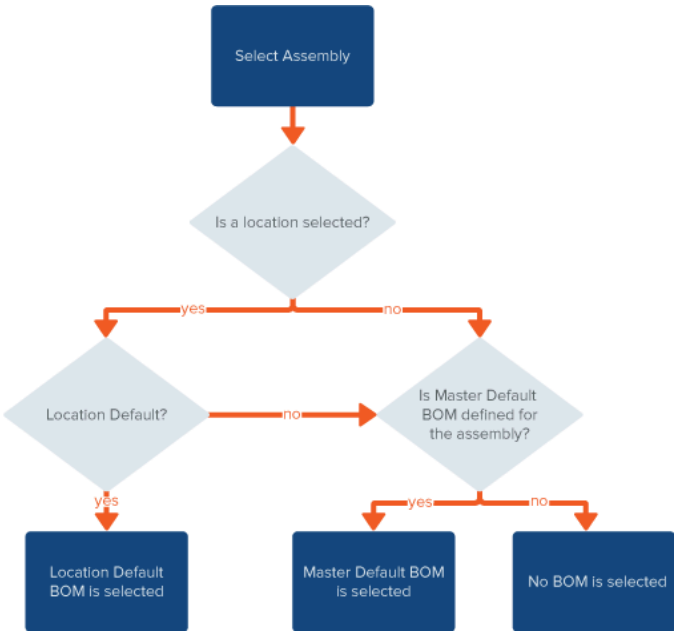
   For example, change Engineering V1 BOM to Engineering V2 BOM.
5. Make other changes as necessary.
6. Click **Save**.

Default BOM Workflow

Advanced BOM lets you assign a location-specific default BOM or a master default BOM to an assembly.

For example, you can set one BOM as the master default for the assembly. Then, set a second BOM as the East Coast location default. A BOM cannot be both a master and location default. They must be assigned to separate BOMs within an assembly.

The following diagram displays the workflow an assembly follows to select the appropriate BOM:



For example, a mountain bike work order assembly is fulfilled at Wolfe Manufacturing's Canadian facility. Canadian models of the mountain bike use a different wheel assembly than those manufactured in the United States. To complete the order, the system searches the BOM settings for a location default BOM. If a Canadian default location BOM exists, it is selected.

If a Canadian location default is not defined, the assembly then searches for a master default BOM. If a master BOM is assigned, it is selected. If a default BOM is not assigned, no BOM is selected.

When an assembly has no BOM defined, the **Items** sublist on the Work Order is empty. You must manually add components.

This default BOM workflow logic also applies to the following NetSuite records and transactions:

- Work orders
- Assembly builds and unbuilds
- Supply plans
- Standard cost roll-ups
- Phantom items
- BOM inquiries

Creating BOM Revisions

A BOM revision let you update a BOM's details throughout the product lifecycle. A BOM revision also provides an accessible revisions history. Use revisions to compare and track cost savings when many BOM revisions are used in production.

For example, revision Engineering RV2 saves Wolfe Manufacturing $27,000 dollars a year because it uses a simplified spoke insertion method on its wheel assembly. This results in faster machine run times compared to the previous Engineering BOM.

To create a BOM revision:

1. Go to Lists > Supply Chain > Bill of Materials.

2. Beside the BOM you want to revise, click **View**.
3. On the **Revisions** subtab, click **Create New Revision**.
4. Enter a revision **Name**.
5. In the **Memo** field, enter any information you want to include with this revision.
6. To set an **Effective Start Date** and **Effective End Date**, click the calendar icon and then select a date from the calendar.

   If you do not enter an effective end date. Future BOM revisions may be affected.

   > **Note:** Only one revision can be active at a time. BOM revision start and end dates cannot overlap. Gaps between revision dates are permitted.
   >
   > For more information, see the help topic Updating BOM Revision Record Dates.

7. Check the **Inactive** box if you do not want this BOM to appear in search lists on records and forms.

   Clear this box if you want this BOM to appear in lists.
8. Click **Save**.
9. On the **Revisions** subtab, click **Edit** beside the revision you created.
10. On the **Components** subtab, select an **Item** to include with this revision.

    All associated revision components appear in this subtab.
11. Accept or edit the **BOM Quantity**.

    You can enter partial quantities up to 5 decimals.
12. Select or enter the **Units**.

    Use the unit of measure that is defined on the BOM and consumed in production. The unit improves flexibility, makes BOMs easier to read, and enables you to specify quantity units of measure.

    Select an **Item Source**.

    The work order item source determines where item quantities are taken from. For example, from stock, work order, or purchase order.

    For more information, see the Item **Source** field on the Phantom Assemblies window.
13. To add more items, click **Add** and then repeat steps 9 through 12.

    After you select your components, use the **Move** buttons to change component order.
14. Click **Save**.

Copying BOM Revisions

Copying a BOM revision is a convenient way to reuse existing work to help you create a new revision. It also reduces input tasks and helps maintain consistency across records.

To copy a BOM revision:

1. Go to Lists > Supply Chain > Bill of Materials.
2. Beside the BOM containing the revision you want to copy, click **View**.
3. Beside the revision you want to copy, click **Edit**.
4. Click **Actions** and then click **Make a Copy**.
5. Change the **Name** of the new BOM revision.

   For example, change Engineering Rev1 BOM to Engineering Rev2 BOM.

6. Optionally, update the **Memo** text.
7. Accept the default **Bill of Materials**, or select a new one.

   You can copy a revision from one BOM and associate it with another BOM.

   For example, you can move an assembly from an engineering BOM to a production BOM.
8. Accept the default **Start** and **End Dates**, or select new dates.
9. Check the **Inactive** box if you do not want this routing to appear in routing lists on records and forms.

   Clear this box if you do want this routing to show in lists.
10. Accept the default component **Items**, or select a new one.

    To remove a component, select the item and then click **Remove**.
11. Click **Save**.

Updating BOM Revision Record Dates

Advanced Bill of Materials does not permit BOM revision dates on the same BOM to overlap. A current BOM revision must end before a new BOM revision can start. If revision dates overlapped, NetSuite would be unable to identify which revision to select.

Note: You can update the current revision **Effective End Date** on a new revision. If you try to save the new BOM revision without an effective end date, NetSuite prompts you to set the date minus one day. After you click OK, the system automatically sets the date and saves your revision.

For example, BOM Revision 1 was created without an effective end date. You create BOM Revision 2 and enter an **Effective Start Date** of February 25, 2020. Attempting a save displays the following prompt. "Effective End Date of the previous revision is not set. Do you want it to be set to current revision Effective Start Date minus one day?" Click **Go Back** in the message box. Set the **Effective End Date** for BOM Revision 1 to February 24, 2020 and then save BOM Revision 2.

To update a BOM revision date:

1. Go to Lists > Supply Chain > Bill of Materials.
2. Click **View** beside the BOM you want to revise.
3. In the **Revisions** subtab, click **Edit** beside the BOM Revision you want to update.
4. Click the **Calendar** icon beside the **Effective End Date** field and then select a date.
5. Enter a date at least one day before your new BOM Revision **Effective Start Date**.
6. Click **Save**.

Customizing the BOM Revision Component Sublist

BOM revision component sublist customization lets you define and display component level information specific to your business workflows. You can add custom columns, change column order, update column labels, and hide column fields.

To customize a sublist, go to Customization > List, Records, & Fields > Other Sublist Fields. After you create a custom field, it appears on the BOM Revision Components subtab.

Note: The BOM Revision component sublist is not automatically added to the work order.

To add custom columns to a work order:

1. Go to Customization > Lists, Records, & Fields > Transaction Line Fields > New.
2. Complete the **Transaction Line Field** form:
   a. Enter a descriptive **Label** name.
   b. **ID** value is used when scripting to instances of the transaction type.

      Enter a name that begins with custcol and then an underscore. If you do not enter a value, the system generates one. For example, custolcoliqity_vendor_control_no.
   c. Select an **Owner**. Only owners can edit this field.
   d. Enter a **Description** of this field. For example, capture the vendor's lot/serial number during item receipt.
   e. Select the **Type** of field you want to create.
   f. The **Store Value** box is checked by default so that the entered information is stored in the custom field. This enables you to look at data that is stored elsewhere.

      Clear this box to not store changes in the custom field. If you do not store the value, changes are discarded. You can make the field read-only.
   g. Optionally, check the Use **Encrypted Format** box to encrypt stored values for this field in the database (values still appear in the UI).

      After you save this field, you cannot change this option.
   h. Optionally, check the **Inactive** box. Inactive custom fields do not appear on any forms or in global searches.
3. On the **Applies To** subtab, check the **Work Order** box.
4. On the **Sourcing & Filtering** subtab, in the **Source List**, select **BOM Revision Component**.
5. In the **Source From** list, select the **Bill of Materials Revision** custom field.
6. Click **Save**.

   After a BOM revision is selected on a work order, NetSuite automatically retrieves a list of components related to the BOM revision. This ensures that custom field information is included in the work order. For more information, see the help topic Creating Custom Transaction Line Fields.

Linking Assemblies and BOMs

After you create BOM records and revisions, you can link them to individual assemblies. You can also link BOM records to multiple assemblies. For more information, see Linking a BOM to an Assembly and Linking Assemblies to BOM Records.

Linking a BOM to an Assembly

After you create BOM records and revisions, you can link them to individual assemblies. You can also designate a BOM as either a location default or master default for that assembly.

To link a BOM to an assembly:

1. Go to Lists > Accounting > Items.

2. Beside the item you want to update, click **Edit**.
3. Click the **Manufacturing** subtab.
4. In the **Current Revision** list, select a BOM to associate with this assembly.

   The displayed **Current Revision** name is the same as the **Bill of Materials** revision name.
5. To designate this as the default BOM for the assembly, check the **Master Default** box.

   Checking this box disables the **Default for Location** option.
6. Alternatively, check the **Default for Location** box to designate a default location. Select a location from the list.

   For example, the West Coast location is the default location BOM. It is also the default assembly location. To see the example illustrated, see the help topic Default BOM Workflow.
7. To add more BOMs for this assembly, click **Add** and then repeat steps 4 to 6.

   For example, Wolfe Manufacturing operates from 10 distinct locations. BOM U.S. is designated as the default for 6 locations and BOM CA is the default for the remaining 4 locations.
8. Click **Save**.

Linking Assemblies to BOM Records

After you create a Bill of Materials (BOM), you can link it to one or more assemblies. All assemblies associated to the BOM appear on the Assemblies subtab.

To link an assembly to a BOM record:

1. In the BOM record, click the **Assemblies** subtab.
2. In the **Assembly** list, select the assembly you want to link to the BOM.
3. Click **Add**.
4. Click **Save**.

   From the BOM record you can assign the same default assembly record validation (master default or location-specific default) to the BOM. A BOM cannot be both master and location default. They must be assigned to separate BOMs within an assembly.

   For example, you can set one BOM as the master default for the assembly. Then, set a second BOM as the East Coast location default.

Creating a Manufacturing Routing

In Advanced BOM, routings are associated with a Bill of Materials. This association enables you to define default routings for multiple BOMs.

For example, The Wolfe Company manufactures mountain bikes its U.S. location. To do this, the U.S. location uses BOM U.S. prompting NetSuite to automatically select the BOM U.S. Routing. Due to increased mountain bike sales, Wolfe starts to manufacture mountain bikes in Canada. To manufacture mountain bikes in Canada, BOM CA is selected and the system automatically uses BOM CA Routing.

Important: You cannot update Bills of Materials for routings that were used before Advanced BOM was enabled.

The Manufacturing Routing page at Lists > Supply Chain > Manufacturing Routing displays the following updates:

- Legacy routings are associated with legacy BOMs.
- Bill of Materials replaces the assembly (item) list.
- The Component per Operation subtab changes to read-only for legacy BOM routings. This subtab displays a line for each component and revision combination.

  For example, a bicycle frame component appears in multiple revisions of the Mountain Bike BOM. Each revision in this BOM displays a line each time the frame component appears in Mountain Bike BOM Revisions.

To create a manufacturing routing:

1. Go to Lists > Supply Chain > Manufacturing Routing > New.
2. If you use NetSuite OneWorld, select a **Subsidiary**.
3. Select a **Bill of Materials** from the list.
4. Select or enter one or more **Locations** where this assembly is performed.
5. Enter a routing template **Name**.

   This name appears in the manufacturing routing field routings list on records and forms. For example, Beta Alternate Supply Routing.
6. Optionally, enter a **Memo** for this routing.

   You can search for the text you enter in this field. For example, enter **Use Beta Alternate when primary widget supply is unavailable**.
7. To use this routing by default for item forms, check the **Default** box.

   This sets the default steps for creating new special work orders and mass created work orders.

   Clear this box if you do not want this routing to be the default.
8. Check the **Inactive** box if you do not want this routing to appear in routing lists on records and forms.

   Clear this box if you want this routing to appear in lists.
9. If you want NetSuite to calculate lag times for operation tasks, check the **Auto-Calculate Lag** box.

   For more information, see the help topic Operations Overlap.
10. Click the **Routing Steps** subtab and then complete the fields, as required.
11. Click **Save**.

Copying a Manufacturing Routing Record

You can manually copy an existing manufacturing routing record and then reuse it with a new BOM. Reusing existing routings saves time, leverages existing processes, and avoids manual copy errors.

For example, Wolfe Manufacturing builds bicycles in their Denver location using the BOM U.S. Routing. The company then starts manufacturing bicycles at their Ontario location. By copying the BOM U.S. Routing and renaming it to BOM ON Routing, the Ontario location can follow the U.S. manufacturing process.

To copy a manufacturing routing record:

1. Go to Lists > Supply Chain > Manufacturing Routing.
2. Beside the routing you want to copy, click **View**.

3. From the **Actions** list, click **Make Copy**.
4. Change the manufacturing routing **Name**.

   For example, change BOM U.S. Routing to BOM ON Routing.
5. Make other changes to the routing, as necessary.
6. Click **Save**.

Running a BOM Inquiry

A Bill of Materials Inquiry enables you to review the build requirements for an assembly item. The BOM displays the assembly components and the number of each component needed for each assembly.

To run a Bill of Materials Inquiry:

1. Go to Transactions > Manufacturing > Bill of Materials Inquiry.
2. If you use NetSuite OneWorld, select a **Subsidiary** from the list.
3. Optionally, select an **Assembly** to filter the available bills of materials.
4. Optionally, select a **Location** to display data for that location.
5. To limit the details to the top level of member items, check the **Top Level Only** box.

   Sub-assembly information does not appear.

   To show details about all levels of member items, clear the **Top Level Only** box.
6. Select a **BOM Display Control** option:
   - **By Date** – the Bill of Materials Revision field is disabled.

     If the date changes, the Bill of Materials revision field displays a new BOM revision.
   - **By Revision** – the Bill of Materials revision field is enabled.
7. Select the **Bill of Materials** to run this inquiry against.

   This selection can automatically populate the Bill of Materials Revision and Effective Date fields.
8. To change the default revision, select a **Bill of Materials Revision.**
9. To change the default date, click the **Effective Date** calendar icon and then select a date from the calendar.

Costed Bill of Materials Inquiry

The Costed BOM Inquiry report details individual and aggregated assembly costs. It shows how cost components are rolled up to an assembly item based on the BOM. This report includes material and conversion costs (labor and machine costs and their overhead).

Note: Standard costing and assemblies must be enabled to use the Costed BOM Inquiry. You can run this inquiry for a standard cost assembly item only.

To run a Costed Bill of Materials Inquiry

1. Go to Transactions > Manufacturing > Costed Bill of Materials Inquiry.
2. If you use NetSuite OneWorld, select a **Subsidiary** from the list.

3. Optionally, select an **Assembly** to filter the available Bills of Materials.
4. Select a **Location** to display data for that location.
5. To limit the details to the top level of member items, check the **Top Level Only** box.

   Sub-assembly information does not appear.

   To show details about all levels of member items, clear the **Top Level Only** box.
6. Select a **BOM Display Control** option:
   - **By Date** – the Bill of Materials Revision field is disabled.

     If the date changes, the Bill of Materials Revision field displays a new BOM.
   - **By Revision** – enables the bill of materials revision field.
7. Select the **Bill of Materials** you want to run the from the list.

   This selection can automatically populate the **Bill of Materials Revision** and **Effective Date** fields.
8. To change the default revision, select a **Bill of Materials Revision**.
9. To change the default date, click the **Effective Date** calendar icon and then select a date from the calendar.

Matrix Items

Matrix items consist of multiple combinations of product styles and variations with their respective bill of materials and routings. During production, matrix assemblies can be created using work orders and assembly builds.

If you use the Advanced BOM feature, the Bill of Materials subtab appears on the Manufacturing subtab:

- The Bill of Materials subtab moves from the matrix assistant to the Manufacturing subtab.
- Both parent and child items display a bill of materials sublist.
- BOMs can be copied from parent to child item records.
- The BOM sublist can be updated on child items.
- You can assign a BOM or multiple BOMs to an assembly matrix.
- The Components subtab no longer appears on the Matrix Assistant.

> **Note:** You can add BOMs only from the assembly matrix parent or subitem.

To assign a BOM to an assembly matrix:

1. Go to Lists > Accounting > Items.
2. Beside the item you want to update, click **View**.
3. In the **Assembly/Bill of Materials** window, click **Edit**.
4. Click the **Manufacturing** subtab.
5. Select a **Bill of Materials** from the list.
6. To assign a BOM as a default for the assembly, check the **Master Default** box.
7. Alternatively, you can check the **Default for Location** box. Select the location from the list.

   For example, if the West Coast location is the default location BOM. It is used as the default for the assembly and the West Coast location. To see an illustration of this example, see Default BOM Workflow.

Note: A BOM cannot be both a master and a location default. Only one default designation is allowed for a BOM.

8. To apply the BOM subtab settings to child matrix items, click **Update Matrix**.
9. In the **Update Matrix Item** window, check the child items to **Include** in this update.
10. To copy the parent BOM to all child BOMs (mass update), check the **Update BOMs of Matrix Sub-items** box.
11. Click **Submit**.

Bill of Materials Member Control for Assembly Items

When you use the Assembly Items feature, the components needed for assemblies are identified in the Bill of Materials (BOM). Components required for an assembly can change due to engineering changes, vendor supply, availability, or seasonal requirements.

BOM member control helps you ensure that the right components are included in assembly builds at the right time. You can use BOM controls to plan for the utilization and purchase of components that are effective or obsolete within specific time frames.

To use BOM component member control, define effective and obsolete dates for member items on assembly records. NetSuite determines whether a component is valid for an assembly based on these date.

- **Effective Date/Revision** – Defines the first date an item can be used for an assembly. Before the effective date, the item is not included in the BOM.
- **Obsolete Date/Revision** – Defines the last date an item can be used for an assembly. After the obsolete date, the item is not included in the BOM.

After a work order is created, NetSuite determines which components are required based on the transaction date. If you use the Demand Planning feature, NetSuite considers the production start date and determines which components are required on that date.

On assembly item records, choose a BOM control method and set up effective and obsolete dates. NetSuite uses them to determine which member items are needed to create an assembly based on the date the item is produced.

For example, Wolfe Manufacturing assembles bicycles for distribution throughout the year. The mountain bike component item includes the following:

- Disk brake 1: has an effective date of 4/1/2020
- Disk brake 2: has obsolete date of 3/31/2020

Wolfe creates a work order dated 3/31/2020 that includes a Mountain Bike assembly. NetSuite examines the effective and obsolete dates for the components on the assembly record and determines the following:

- The BOM will not include Brake 1 because it is not effective.
- The BOM will include Brake 2 because it is not obsolete.

Wolfe enters a work order dated 4/1/2020 that includes a Mountain Bike assembly, and NetSuite determines the following:

- The BOM will include Brake 1 because it is currently effective.
- The BOM will not include Brake 2 because it is obsolete.

The appropriate assembly BOM items are shown on work orders at the appropriate dates without having to manually change each work order.

For BOM management to track which components are needed at specific times, identify effective and obsolete dates for member items. To do this, select a BOM control method on assembly item records. Select to set dates individually for components or to create revision records to assign to items. When a new work order is created, NetSuite can determine the member items required based on the work order production date. For more information, see Setting Up BOM Control on Assembly Item Records.

You can choose to set an assembly to use revision control. For more information, see Setting an Assembly to Use Revision Control.

If you choose to manage assembly BOMs with revision records, set up revision records. For more information, see Creating Revision Records for BOM Control.

Setting Up BOM Control on Assembly Item Records

To use Bill of Materials (BOM) component member control, define effective and obsolete dates for assembly record member items. You can enter the effective and obsolete dates individually on assembly records. You can also create revision records that update many assembly records at one time. The following methods enable you to manage which items are used in assemblies based on production dates. Select one of the following methods:

- Using Effective Date BOM Management – Control the BOM based on dates entered on the assembly record's Components subtab.
- Revision Control BOM Management – Control the BOM by selecting a version with preset dates that determine components.

Using Effective Date BOM Management

Use Effective Date BOM management to set the effective and obsolete dates for items on individual assembly records.

To set up Effective Date BOM Control on assembly records:

1. Go to Lists > Accounting > Items.
2. Click **Edit** next to the existing assembly item record.

   You can also click **New** to enter a new assembly record.
3. On the **Purchasing/Inventory** subtab in the **Effective BOM Control** field, select **Effective Date**.
4. Click the **Components** subtab.
5. Click an existing member item or add a new one.
6. In the **Effective Date** field, enter the date when an item can be included as a member for an assembly.
   - After the Effective Date, the item is included in the BOM.
   - Before the Effective date, the member is not included in the BOM.

   Note: A blank effective date indicates the item has always been included.
7. In the **Obsolete Date** field, enter the date when an item can be included as a member for an assembly.
   - After the Obsolete Date, the item is not included in the BOM.
   - Before the Obsolete Date, the member is included in the BOM.

   Note: A blank obsolete date indicates that the item will always be included.
8. Click **Add** or **Done**.
9. Repeat steps 3 to 8 to set effective or obsolete dates for additional members of this assembly

10. Click **Save**.

NetSuite can source this item record to determine the correct BOM based on the assembly production date.

Revision Control BOM Management

To manage the Bill of Materials (BOM) for assembly items, use Revision Control as your Effective BOM Control method. This method simplifies effective and obsolete date management. To use revision control, create revision records that define an effective date or an obsolete date. The revision records you assign to assembly members determine their effective and obsolete dates.

The Revision Control method enables you to set the effective or obsolete date for many items at one time by updating one revision record. When several items use a revision record, date changes can be made on the revision record rather than individually for many member items. Rather than changing the dates on every line item, you change only the effective or obsolete date in the revision record.

For assembly items that use Revision Control, create revision records to define effective and obsolete dates. The assembly effective and obsolete dates are determined by the assigned revision record.

Revision records can be created in two ways:

- As individual records. For more information, see Creating Revision Records for BOM Control.
- From assembly record Members subtab. For more information, see Setting an Assembly to Use Revision Control.

After a revision is assigned to an assembly member, you can enter a new work order and select the assembly. The correct revision defaults to based on the work order production date. The work order item list displays the correct set of member components based on the revision used.

- If you select a new revision, the item list updates to show the correct member items.
- If you change the date, NetSuite updates the revision to the one which is effective for that date.

To use only the assembly default revision, on the work order form, click Customize and then make the field not selectable

- Edited revision record effective or obsolete dates are not retroactive. Previously entered transaction data using that revision remain unchanged.
- BOMs created for individual assembly builds compare the transaction date to the effective and obsolete dates.
- On an assembly unbuild, select a revision to determine the BOM. The default revision for an unbuild is based on the current date.
- BOM costs using Standard Costing are based on the effective date shown on the planned standard cost rollup record.

Note: If you use the Matrix Items feature, you cannot set the Effective BOM Control to Revision Control on a matrix parent item. However, you can set the Effective BOM Control to Revision Control on a matrix subitem.

On Work Orders

NetSuite automatically populates the work order effective revision based on the effective date. If you change the work order, NetSuite changes the components on the top level assembly based on the revision selected.

If you change the work order revision and the Build Subassembly box is checked, top-level components change based on the selected revision. The lower level components are determined based on the effective date.

Demand Planning

When demand increases for member items from a parent assembly, NetSuite reviews the work order start date to determine demand for those member items. For example, the Mountain Bike component items include the following:

- Brake Item 1: has an effective date of 4/1/2020
- Brake Item 2: has obsolete date of 3/31/2020

Demand for the item requires a work order to be created on 3/20 and one on 4/20. Therefore, the first work order uses the Member Item 2, and the second one will use Member Item 1. This is relevant if the member items are assemblies that need to have work orders created for them.

Setting an Assembly to Use Revision Control

To use revision records to manage effective and obsolete dates, set the assembly record to use revision control.

To set an assembly to use revision control:

1. Go to Lists > Accounting > Items.
2. Click **Edit** next to the assembly item record you want to set.
3. On the **Purchasing/Inventory** subtab, in the **Effective BOM Control** list, select **Revision Control**.

   Note: If you select Revision Control, you must use revision control for this item.
4. The **Default Revision** field displays the default revision for this item.
5. If you are creating a new item record, click **Save** and then click **Edit** to re-open the item.

   If you are editing an item already set to revision control, go to the next step.
6. Click the **Components** subtab.
7. Select an existing member **Item** or add a new one.
8. In the **Effective Revision** field, enter a revision or create a new one. The revision record effective date determines the start time when this item is included as a member for an assembly.

   For each member, the default selection is **Default**. The item will then be included in builds by default.

   a. To define a non-default date revision record, in the **Effective Revision** field, select **New**

   b. In the **New Item Revision** popup window, define the following for the assembly item:

   - **Name** (for example, Version 2)
   - **Effective Date** (for example, 4/1/2020)
   - **Memo** – Optionally enter a memo.
   - **Inactive** – Check this box to not display this revision in lists.

   Alternatively, enter new revision records at Lists > Accounting > Item Revisions. For more information on revision records, see Creating Revision Records for BOM Control.

For more information about using effective fields, see Setting Up BOM Control on Assembly Item Records.

9. Select an **Obsolete Revision**. The obsolete revision record date determines the end time that an item is to be used for an assembly.

   When you select an obsolete revision, the correct obsolete date displays in that field.
10. Click **Done** or **Add**.
11. Repeat the steps 1 to 4 for each member item you want to assign a revision to.
12. Click **Save**.

The BOM for this assembly is determined by referencing the production date of each work order against the revision record dates for member items.

Creating Revision Records for BOM Control

When using the Revision Control method for Bill of Materials (BOM) management, create revision records to assign to assembly items. These revision records define effective and obsolete dates and can be assigned to many items.

Update effective and obsolete dates on the revision record one time to change the dates for many items.

To create a revision record:

1. Go to Lists > Accounting > Item Revisions > New.
2. Select an **Item** to be associated with this revision.

   Required fields display a red asterisk (*****).
3. Enter a revision **Name**. For example, Version One.
4. Enter the revision **Effective Date**.
5. Enter a **Memo** about this revision. You can later search for this version by memo text, if needed.
6. Check the **Inactive** box to not display this revision in lists.
7. Click **Save**.

Obsolete Dates

Obsolete dates on a revision record cannot be edited. You can set the effective date and then save the revision. NetSuite then determines the obsolete date to avoid gaps or overlaps in dates covered by revisions.

The obsolete date field does display a value if you try to insert a revision record between two others.

For example, you have a default revision and one with an obsolete date of 1/1/2017. The default revision has an obsolete date of 12/31/2017. Next, you create a revision with an effective date of 1/1/2017. In this case, the obsolete date is set to 12/31/2017. After you save, NetSuite changes the obsolete date of the Default revision to 12/31/2016. If you create another revision with an effective date of 1/1/2018, it has no obsolete date. This is because it is the one with the latest effective date. When you save it, it still has no obsolete date and the 2017 revision has its obsolete date set to 12/31/2017.

Note: You can use the Import Assistant to add or update item revision records based on CSV file data. For more information, see the help topic Item Revision Import.

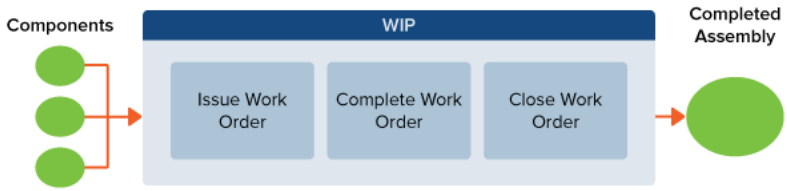
Manufacturing Work In Process (WIP)

Manufacturers often use work orders to assemble the materials needed to produce an item. Manufacturing Work In Process lets manufactures track work orders through the production process, from gathering materials, through shop floor assembly, to stocking finished goods.

Assembly items built using Manufacturing Work In Process (WIP) are divided into the following processes:

1. **Issue Work Order**: Move raw materials to an assembly area (work center)
2. **Complete Work Order**: Assemble raw materials and stock finished goods
3. **Close Work Order**: Reconcile variances

This separation lets you enter work order transactions that define the completion of each step, from material consumption to assembly and completion.



To know where materials are in the manufacturing process, use WIP to track your materials and record the number of:

- Component materials in stock
- Component materials consumed against a work order
- Finished assemblies in stock
- Assemblies you can build

Use WIP to track assembly component to identify the materials not used in the process.

Tracking goods and materials enables you to control your inventory and raw materials. Controlling stock can help you avoid the following:

- Tying up funds in stock or on the production floor
- Unanticipated raw material stock-outs

NetSuite supports production processes with a long lead time and can track item assemblies as a work in process.

To learn when materials are issued or removed from inventory, see Entering Work Order Issues.

To use WIP, enable the feature and set up item records, see Enabling the WIP Feature.

Note: On transactions using WIP, you must identify a WIP location for line items. The WIP line location must match on all work order issue, work order completion, and work order close transactions.

Enabling the WIP Feature

Before you can work with Manufacturing Work in Process (WIP), you must also enable Assemblies and Work Orders. For more information, see Enabling Assembly Items and Assembly Work Orders.

To enable the feature:

1. Go to Setup > Company > Enable Features (Administrator).
2. Click the **Items & Inventory** subtab.
3. Check the **Manufacturing Work In Process** box.
4. Click **Save**.

After the feature is enabled, you can set up items for WIP processing. For more information, see Setting Up Items as WIP Assemblies.

Setting Default WIP Accounts

NetSuite WIP enables you to set default preferences for new item records. To set preferences, , and then

To set default WIP accounts:

1. Go to Setup > Accounting > Accounting Preferences.
2. Click the **Items & Transactions** subtab.
3. Set the following accounts:
   - **Default WIP Cost Variance Account** – The selected account appears by default in the **WIP Cost Variance Account** field on item records. This is an expense account for actual or average cost assemblies when the reconciliation amount cannot be returned to the asset account. This happens when the amount has been shipped. This account is required if WIP is checked for any location.
   - **Default Scrap Account** – The selected account appears by default in the **Scrap Account** field on item records. This is an expense account for scrapping that occurs during the work order completion. This account is required if WIP is checked for any location.
   - **Default WIP Account** – The selected account appears by default in the **WIP Account** field on item records. This is an asset account used when a work order component issue is entered. This account is required if WIP is checked for any location.
4. Click **Save**.

Setting Up Items as WIP Assemblies

After your administrator enables the Manufacturing Work In Process (WIP) feature, you can set up assembly items to use WIP.

To set up an assembly item to use WIP:

1. Go to Lists > Accounting > Items.
2. Click **Edit** next to the existing assembly item record.

   Alternatively, click **New** to enter a new assembly record.

   Only items that use standard or average costing can be used on a WIP work order.
3. On the **Basic** subtab, make a selection for the following accounts:
   a. **WIP Cost Variance Account** – The expense account for actual cost or average cost assemblies. This is used when the reconciliation amount cannot be returned to the asset

account because the amount has been shipped. This account is required when WIP is checked for any location.

b. **Scrap Account** – The expense account for scrap that occurs during work order completion. This account is required if WIP is checked for any location.

c. **WIP Account** – The asset account used when a work order component issue is entered. This account is required if WIP is checked for any location.

> **Note:** If you change the selected WIP account, the new WIP account affects only future transactions. Existing transactions continue to show the WIP account when the transaction was created.

4. To create a new assembly, complete assembly item form fields. For more information, see the help topic Creating Item Records.
5. Click **Save**.

When the assembly is added to a work order, you can use WIP to process the assembly.

Work orders that are only partially completed do not account for unused WIP components. They are moved into the cost of the finish goods account, even if they have not been used.

Using WIP on Work Orders

The following procedure provides instructions for using WIP on work orders.

To use WIP on a work order:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. Complete the fields, as required.
3. To use WIP **rather than a standard assembly build** on this work order, check the **WIP** box.

> **Note:** You cannot clear the WIP box after a posting assembly transaction has been attributed to this work order.

4. Select a **Location**.

   This field is required for WIP work orders.
5. Complete the necessary form fields. For more information, see Entering an Individual Work Order.
6. Click **Save**.

After you designate a work order as WIP, complete the build process using the following:

- **Work Order Issue** – Issue components to track material consumption or log service against a work order.

  For more information, see Entering Work Order Issues.
- **Work Order Completion** – Identify the quantity completed and stocked.

  For more information, see Entering Work Order Completions.
- **Work Order Close** – Generate reconciliation entries to post variances that may occur during the manufacturing process.

  For more information, see Entering Work Order Closes.

The following table shows an example of the general ledger impact for WIP transactions:

Consumption			
	Component Asset	Location	CR– (credit)
	Component Asset	WIP	DR+ (debit)
Completion			
	Assembly Asset	Location	DR+
	Assembly Asset	WIP	CR–
Close			
	Assembly Asset	WIP	DR+
	Component Asset	WIP	CR+
	Variances	WIP	DR+

Entering Work Order Issues

When you use the Manufacturing Work In Process (WIP) feature, you must issue components to start work order processing. When you issue components, you are logging only the material consumption, not any work on the assembly process.

The work order issue indicates the material is consumed against the work. Issue assembly member components to track material consumption or log service against a work order.

After components are issued, the material value is recorded in the assigned WIP account. You can issue components for many work orders at one time.

If you use the Multiple Units of Measure feature, the issued component quantity is recorded in base units.

To bulk enter work order issues:

1. Go to Transactions > Manufacturing > Issue Components.
2. If you use NetSuite OneWorld, select a **Subsidiary** from the list.
3. Optionally select the following to filter the list of work orders:
   - **Item**
   - **Customer**
4. Select the **Posting Period**.
5. Select the **Date** for this issue transaction.
6. Select a **Location** from the list.

   Location is displayed in the location field in the header of all work order issues.
7. Select a **Filter By** option:
   - **Some Items Committed** – Displays the committed quantity
   - **All Items Fully Committed** – Displays the committed quantity
   - **Ignore Commitment** – Displays the remaining quantity
8. Check the **Issue** box next to all work orders you want to create issues for.
9. Click **Submit**.

   After the page is submitted, the work order issues are generated for all marked orders.

After you issue components for an order, you can enter a work order completion against it to log the finished assemblies. For more information, see Entering Work Order Completions.

Issuing Components for an Individual Work Order

You can issue components for a single work order.

To issue components for an individual work order:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Click **View** next to the work order you want to issue components for.
3. Click the **Issue Components** button.
4. In the **Reference #** field, you can enter a reference number to track this transaction.
5. In the **Assembly** field, select the assembly item you want to complete. A completion can be entered only for assembly items on record.

   To create new assembly item records, click Assembly at Lists > Accounting > Items > New .
6. Select the **Revision** to use for this completion. For more information, see Revision Control BOM Management.

   The **Manufacturing Routing** field displays the associated routing.

   The **Created From** field identifies the work order that this issue is created from. The work order is linked to the issue record.
7. Select an issue **Date**.
8. Select the transaction **Posting Period**.
9. Optionally, enter a **Memo** for this transaction.

   You can search for text entered here to find the transaction later.
10. Select a **Department** or **Class**, if you use them.
11. Select a **Location**.
12. Select a **Starting Operation** and **Ending Operation** to define a range.

    The default component quantity shows for components to be issued within the operation range.
13. For each component, verify or enter the quantity being issued. The remaining committed component quantity shows by default.
14. Click **Save**.

Entering Work Order Completions

To use the Manufacturing WIP, enter a completion transaction to log the number of assemblies you completed and stocked for a work order. This transaction indicates the number of finished goods produced.

Entering a completion does not record the consumption of materials. It only records the work done on the assembly process and journals the value of the assembly out of the assigned WIP account.

You can enter a work order completion with backflush to issue components and complete the assembly at one time.

To enter a work order completion:

1. Go to Transactions > Manufacturing > Enter Completions.
2. Select an assembly **Item** to filter the list and show only work orders for the item.
3. Select the **Customer** or vendor providing this item.

   Alternatively, select an employee to associate with this transaction.
4. Select the **Posting Period** to post this transaction to.
5. Accept today's **Date** as the transaction date, or select another date.
6. Select a **Location** to use to build orders, issue components, or enter completions.

   This location appears in the location field in the header of all work order completions created.
7. To enter completions with backflush, check the **Backflush** box.

   Backflush records component consumption at the same time. Component consumption is based on the proportion designated on the original work order and the build quantity.

   Clear this box to enter the completion without backflush and not record consumption.
8. Enter a **Sales Order Number** or scan a transaction bar code.
9. Check the box in the **Complete** column for each order to be completed.
10. Verify or enter the quantity completed for each order.

    The field shows the quantity remaining on the order by default.
11. Click **Submit**.

    After a completion is entered against a work order, that quantity of assemblies is recorded as being built and stocked in inventory.

Note: The work order completion **Projected Value** field displays the cost of the assembly. It does not display individual components (unless you use backflush). A Work Order Close for the work order shows the difference between the cost of the assembly and the components.

Entering Work Order Closes

Use Manufacturing WIP to enter a work order close to finalize the accounting for that order. The work order close reconciles the accounting by reviewing all issues and completions associated with that work order.

To bulk enter work order closes:

1. Go to Transactions > Manufacturing > Close Work Orders.
2. Select the **Posting Period**.
3. Select the transaction **Date**.
4. Select a **Location**.
5. Optionally, select the following to filter the list of work orders:
   - **Item**
   - **Customer**
6. To include work orders with In Process or Built status, check the **Include In Process Work Orders** box.
7. This list includes work orders in Released and Planned status.

   To show only work orders in Built and In Progress status:
   a. Go to Transactions > Manufacturing > Close Work Orders

b. In the **Close Work Orders** page, click **Customize**.

c. In the **Customize Sublist** page, click the **Additional Filters** subtab.

d. Beside the **Status** field, check the **Include** checkbox.

e. Click **Save.**

8. In the **Under-Produced Variance Tolerance (%)** field, enter a percentage to close only orders that produced less than planned.

   This helps determine whether some orders should not be closed because enough finished products have not been produced.

   Order Variance Calculation: quantity ordered - quantity built/quantity ordered = variance percentage

   A percentage in this field filters the list to show only orders that have a variance lower than the percentage entered.

   For example, if order quantity is 10 and built quantity is 5, then the variance percentage is (10-5)/10 = 50%.

   If you enter a tolerance of 60%, this order shows in the list for closing.

   If you enter a tolerance of 10%, this order does not show in the list.

9. In the **Production Variance Tolerance (%)** field, enter a percentage to filter out orders that have a specific value variance.

   The order variance calculation is: absolute value (remaining WIP value / WIP of assembly) = variance percentage

   A percentage in this field filters the list to show only orders that have a variance lower than the percentage entered.

   For example, the WIP account value is $10, and the cost of building the assembly is $20. Therefore, the variance percentage is (10/20) = 50%.

   If you enter 10% in this field, this order does not show in the list for closing.

   If you enter 60% in this field, this order shows in the list.

10. You can filter the list order by selecting a range of dates.

    If you use demand planning, optionally filter the list by selecting a production start date and end date.

    1. To filter by an order date range, enter a beginning date in the **Order Date From** field. Enter an end date in the **Order Date To** field.
    2. To filter by a production start date range, enter a beginning date in the **Production Start Date From** field. Enter an end date in the **Production Start Date To** field.
    3. To filter by a production end date range, enter a beginning date in the **Production End Date From** field. Enter an end date in the **Production End Date To** field.

11. Next to all orders you want to close, check the **Close** box.

12. Click **Submit**.

Entering a Close for an Individual Work Order

You can also enter a close for a single work order.

To enter an individual work order completion:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.

2. Beside the work order you want to close, click **View**.
3. Click the **Close** button.
4. Complete additional fields on the Work order Close page as necessary.
5. Click **Save**.

Associating Components with Operations

Use the Manufacturing Work In Process (WIP) feature to assign and issue components at the operation level for items you assemble.

Associating components with specific operations can benefit operations that take a long time to complete. Some components may not be required when the work order starts. Therefore, it is not ideal to issue all assembly components during the first operation. If you associate components with specific operations for a routing, components are issued on the day the corresponding operation begins. For example, a work order is set up as follows:

- The routing includes 4 operations
- Each operation takes 1 week
- Operation 4 requires a special component

Work Order - Start Date:	July 1, 2020
Work Order - End Date:	July 28, 2020
Operation 1 - Start Date:	July 1, 2020
Operation 2 - Start Date:	July 7, 2020
Operation 3 - Start Date:	July 14, 2020
Operation 4 - Start Date:	July 21, 2020

- If the special component is linked to Operation 1, the component issue date is July 1, 2020.
- If the special component is linked to Operation 4, the component issue date is July 21, 2020.

To associate a component with an operation:

1. Go to Lists > Accounting > Items.
2. Click **Edit** next to the WIP assembly item you want to work with.
3. Click the **Manufacturing** subtab.
4. Click the **Components Per Operation** subtab.

   The list displays all components and their corresponding quantities, as defined on the component list of the item record.

   > **Note:** To display the Components Per Operation subtab, create a new or edit an existing Manufacturing Routing.

5. Click a **Component Line**.
6. In the **Operations** field, select an operation to associate the component with.
7. Click **Save**.

   After you save your work, the operation associations you set up are applied only to new work orders you create.

Associations can also be defined for existing routings on assembly item records. Based on the specified routing, NetSuite updates the associations to components on work orders.

- One operation can be associated with multiple components.
- Each component line can be associated with only one operation.
- One component can be associated with multiple operations if the component is defined on multiple lines.
- Not all components are required to be associated with an operation. If no operation is defined for a component, that component is issued at the start date for the routing.

Warning: Changing or deleting an operation number breaks all associations to the original operation number. For example, any component associated with the previous operation number will not be associated with the new operation number.

Changing or deleting a component also breaks the association to an operation.

Operation Associations and Sub-Assemblies

If you check the Mark Sub-Assemblies Phantom box, the association between the sub-assembly and the operation is broken. The sub-assembly is replaced with its components on the list of available components. The same operation association is applied to the sub-assembly components. You can create new associations for these sub-assembly components. However, you cannot edit the list of components.

Entering a Completion for an Individual Work Order

You can enter a completion for a single work order.

To enter individual work order completions:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Click **View** next to the work order you want to complete.
3. Do one of the following:
   - To create a work order completion without backflush, click the **Enter Completion** button.

     The completion records the number of assemblies completed against a work order. It does not record component consumption.
   - To create a work order completion with backflush, click the **Enter Completion with Backflush** button.

     This records completion and component consumption.

     Important: If you use Manufacturing Routing and Work Centers, when you enter a completion with backflush, you must complete additional steps. See Entering a Completion With Backflush.
4. On the **Work Order Completion** page, enter a **Reference #** (number).
5. To enter the completions with backflush, check the **Backflush** box.

Backflush enables component consumption to be recorded at the same time. Component consumption is based on the proportion designated on the original work order and the build quantity.

6. Select the issue transaction **Date**.
7. Select the **Posting Period**.
8. Optionally, enter a **Memo**.
9. After you enter a quantity to build, click **Inventory Detail** to specify a bin, serial or lot number for the items being processed.

   If you use Multiple Units of Measure, the Units field on the Inventory Detail record defaults to base units and cannot be changed.
10. Select a **Department** or **Class** if you track them.
11. Select a **Location**.
12. If you are entering a completion with backflush, verify or enter the **Completed Quantity** of each component consumed.
13. Click **Save**.

Entering a Completion With Backflush

If you use Manufacturing Routing and Work Centers, when you enter a completion with backflush, complete the following additional steps.

To enter a completion with backflush:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Access the work order that requires additional steps.
3. In the **Operation Completion** section, select the completed operation tasks.
   - To mark a single operation task complete, select the task in both the **Starting Operation** and **Ending Operation** lists.
   - To mark a range of operation tasks complete, do the following:
     1. To identify the first operation task complete, enter the **Starting Operation**.
     2. To identify the last operation task complete, enter the **Ending Operation**.

   Operation tasks logged as completed include the starting operation, the ending operation, and all operation tasks in between the starting and ending operation tasks.
4. Enter the **Completed Quantity**.

   After you enter the quantity, the **Components** subtab and **Operations** subtab are automatically populated based on requirements.

   For more information, see Routing Completion Labor and Machine Time Entry.
5. Optionally, modify the default quantity issued for components.

   When entering a routing completion with backflush, if the starting operation is the first operation, the quantity issued defaults based on the completed quantity. For example, there are 5 components in each unit. The completed quantity is 60 units, therefore, the form displays 300 of the component item issued.

   > **Note:** If the Allow Overage on Work Order Transactions preference is enabled, then you can complete/issue a quantity larger than planned.
6. If the ending operation is the last operation, you can enter a scrap quantity.

The quantity of assemblies scrapped, posts a value to the scrap account indicated on the item record.

7. Verify the **Quantity to Build**:

   When the ending operation is the last operation, the **Quantity to Build** field is populated with the completed quantity. The quantity is marked completed and moved to inventory.

   You cannot modify the quantity in this field. It updates dynamically based on the starting and ending operation.

8. If this is a lot numbered or serial numbered assembly, click **Inventory Detail** to enter lot or serial numbers.

   If you use Multiple Units of Measure, the Units field on the Inventory Detail record defaults to base units and cannot be changed.

9. Click **Save**.

WIP and Inventory Costing

Only assemblies using standard cost and average cost are compatible with the Manufacturing Work In Process (WIP) feature. Assembly component members can use LIFO/FIFO, standard, average, or actual costing. Assemblies using LIFO/FIFO/specific costing are not compatible with this feature.

Standard cost assemblies have costs calculated based on the WIP account indicated for the order, not by date.

Standard Cost Assembly Revaluations

The standard cost of raw materials can change when a work order is still in process causing a change in the WIP valuation.

For example:

- A bicycle wheel is made of the following component parts: rims, tires, and spokes.
  - Rims cost $5.
  - Tires cost $6.
  - Spokes cost $7.
  - The total bicycle wheel cost is $18.
- When a work order is still in process, the standard cost of components changes to the following:
  - Rims cost $4.
  - Tires cost $5.
  - Spokes cost $6.
  - The total bicycle wheel cost is $15.
- The change in the bicycle wheel cost from $18 to $15 requires the following WIP cost adjustment:
  - (-1) for each component issued
  - (-3) for each assembly taken out of the WIP location

When the standard cost for an inventory or assembly item in a location changes, note the following. NetSuite creates a separate standard cost revaluation transaction for each partially built work order. NetSuite creates standard cost revaluation transactions for each work order that does not have a status of Released or Built.

Posting GL Lines for a WIP Assembly Completion with Backflush

When you enter an assembly completion with backflush, you log the assembly completion and component consumption at the same time. This transaction posts to the general ledger as follows:

Cost of the Assembly

- For an average cost item, an estimate of the last purchase price is used for the assembly posting.
- For a standard cost item, the standard cost is posted.

Cost of a Component

- For an actual cost item or average cost item, the average or actual cost from the warehouse location is posted.
- For a standard cost item, the standard cost for component is posted.

Note: If you use WIP, an average cost assembly item generates a variance based on the assembly cost and the component cost. If an adjustment needs to be made on the average cost based on the variance, you should use an inventory adjustment worksheet.

Manufacturing Routing

Manufacturing Routing and Work Center lets you schedule and record manufacturing operational activities against a work order that requires multiple employees, or work centers. For example, you may have a set of operations for the following: a preparation team, an assembly run team, and a quality assurance team.

You can use the Manufacturing Routing and Work Center feature to record quantity assembly completions and team resource costs. You can also use it to process overhead costs against individual work order operations.

The following roles represent members of your organization who can benefit from using Manufacturing Routing.

Operational Planner or Production Manager

Your Operational Planner or Production Manager can benefit from improved planning efficiency:

- Set up a routing record that defines multiple steps for building a complex assembly.
- Assign default scheduling parameters against each step.
- Use backward scheduling to establish a supply plan based on manufacturing scheduling requirements.

Production Manager

Your Production Manager can refine the shop floor tracking activities using the following:

- Facilitate scheduling by assigning work center groups to operation steps.
- Record progress of activities such as completion and component issue against multiple tasks or one task at a time
- Record actual machine and labor times against anticipated times.

Cost Accountant

Your Cost Accountant can identify opportunity areas:

- Assign labor and machine overheads against completion activities.
- Develop a costing template for standard rates used in multiple routings.
- Track cost variances between actual and standard at a per service item and cost category level.

Important: Be aware of the following:

- Manufacturing Routing can be used only with assembly items using standard costing or average costing.
- Manufacturing Routing can be used only with work orders that are marked as Work In Process (WIP).
- Manufacturing Routing creates variances based on per-service item and cost categories.

To use the Manufacturing Routing and Work Center feature, a user with sufficient permission must do the following:

- enable the feature
- define cost categories
- define charge items
- create cost templates
- define resources
- create routings
- set up standard costing, if required

The following tasks must be completed:

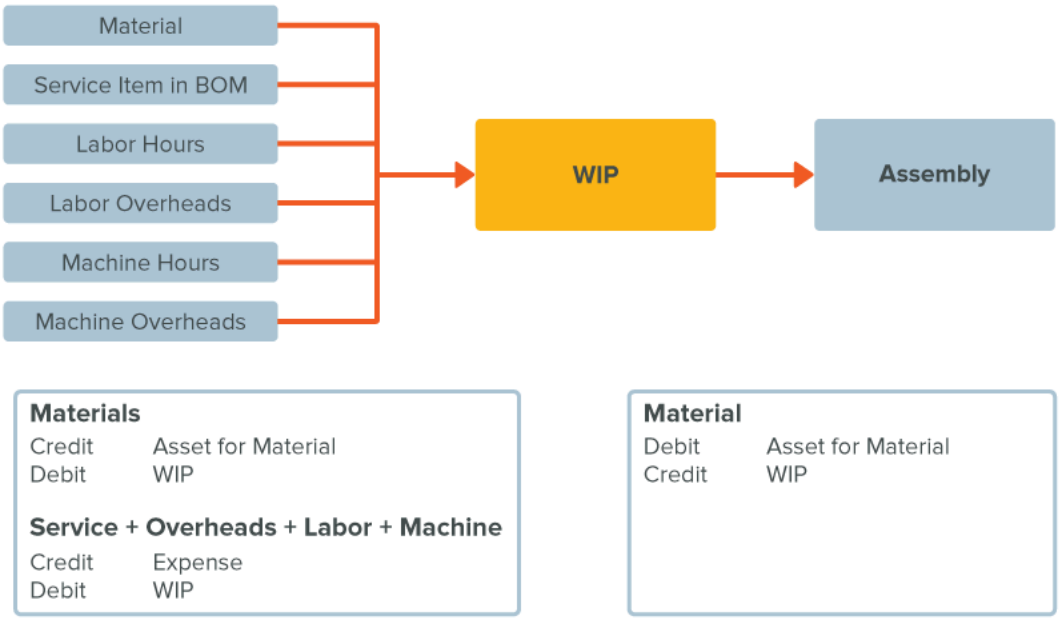
- Complete the Setting Up Manufacturing Routing procedures.

  This lets you use routings on WIP designated work orders.
- The steps required to complete the assembly are detailed in operation task records. For more information, see Manufacturing Routing and Work Orders.

  These task records designate what needs to be done and when, how much has been done, and how much remains to be done. They define how much time you expect to spend on the task and the rates to be charged for it. Task records designate work centers to assign tasks to certain labor resources.
- During the assembly process, NetSuite logs time against tasks to show progress towards completion. By entering data on the completion form you determine the following:
  - **Starting and Ending Operation** – operation tasks that are done
  - **Quantity Completed** – time logged against each operation

Completion records show the time machines and labor used. When time is entered against an operation task, the scheduling for all tasks related to the work order automatically update. This update accurately portrays progress against each operation. For more information, see Manufacturing Routing Completions and Time Entry.

Values for assets and expenses associated with a routing work order post to the designated Work In Process (WIP) account during the assembly process.



Values are added to the WIP account based on time logged against operation tasks or quantity produced in a run. After the assembly process completes, the values are removed from the WIP account and added to the Asset for Assembly account. For more information, see Manufacturing Routing Costing.

Setting Up Manufacturing Routing

To set up manufacturing routing:

1. To enable the feature, see Enabling the Manufacturing Routing Feature.
2. To set preferences, see Setting Routing Preferences.
3. To define cost categories, see Defining Cost Categories for Manufacturing Routing and Work Center.
4. To define manufacturing charge items, see Defining a Manufacturing Charge Item.
5. To group manufacturing charge items into a cost template, see Creating Manufacturing Cost Templates.
6. To define resources, see Creating Manufacturing Work Centers or Groups and Work Center Calendars.
7. To create routings, see Creating a Manufacturing Routing.
8. To set up standard costing, (for accounts using the Standard Costing feature), see Standard Costing for Manufacturing Routing.

Enabling the Manufacturing Routing Feature

Before you can use the Manufacturing Routing and Work Center feature, an administrator must enable it.

To enable manufacturing routing:

1. Go to Setup > Company > Setup Tasks > Enable Features.
2. Click the **Items & Inventory** subtab.
3. Check the **Manufacturing Routing and Work Center** box.
4. Click **Save**.

The following features must be enabled to use the Manufacturing Routing and Work Center feature:

- Manufacturing Work In Process
- Multi-Location Inventory
- Work Orders
- Assembly Items
- Project Management

Setting Routing Preferences

With Manufacturing Routing and Work Center, you can use the **Show Planned Capacity on Work Orders** preference to help manage work order planning. This preference lets production managers and planners monitor planned completion times for work order builds against work center capacity.

Setting this preference enables NetSuite to automatically create planned time entries when processing manufacturing work orders. When you use this preference, work orders display a new Planned Time subtab. NetSuite generates planned time entries showing the amount of time being allocated to each work center per day. The Planned Time subtab displays the duration of each operation and the associated work center. When you examine this planned time data, you can determine if the resource capacity is enough to meet needs, providing efficient manufacturing planning.

Note: You cannot edit the generated planned times.

When you use this preference, NetSuite automatically recalculates planned time after each completion. For example, your process requires Operation 10, which produces a completed quantity of 30. Next, you report the completion of Operation 10 with a quantity of 15 and NetSuite recalculates the planned time for the remaining quantity.

To set routing preferences:

1. Go to Setup > Manufacturing > Manufacturing Preferences.
2. To display the Planned Time subtab on work orders, in the Production Exception section, check the **Show Planned Capacity on Work Orders** box.

   This preference permits NetSuite to automatically create planned time entries.
3. In the **Default Scheduling Method** field, choose either **Forward** or **Backward** scheduling. Your selection appears by default in the **Scheduling Method** field on new work orders you enter. For more information, see Production Scheduling Methods Overview.
4. In the **Create Work Orders in Supply Planning** field, select one of the following to define the default for supply planning work orders:
   - **Do Not Generate**
   - **Generate in Planned Firm Status**
   - **Generate in Planned Open Status**
   - **Generate in Released Status**

   Your selection defines the default status of new work orders generated by a planning engine run.

   Note: If you use the Manufacturing Routing and Demand Planning features, note the following. A selection to generate orders provides the option to define production scheduling methods on work orders. For more information, see Supply Planning and Routing.
5. Click **Save**.

Note: You can activate the Planned Time subtab on work orders that were entered prior to using the **Show Planned Capacity on Work Orders** preference. To do so, open the work order in edit mode, and then save. The Planned Time subtab and planned time entries appear on that work order.

Defining Cost Categories for Manufacturing Routing and Work Center

You can create a cost category to use the Manufacturing Routing and Work Center feature. Cost categories help define expenditures associated with a work order. For example, you have a warehouse

and employ workers to assemble widgets that you sell. You need to track costs associated with employee labor, warehouse machines, and overhead associated with each work order.

You can create one of the following eight cost categories to help track costs:

- **Direct Cost** – These costs are calculated when you record time for these items.
  - **Labor Setup** – Cost of time for labor to set up a run

    For example, this is the cost of paying an employee to set up the machine that will be used to paint the widget.
  - **Labor Run** – Cost of time for labor to run an assembly

    For example, this is the cost of paying an employee to use the machine that paints the widget during the assembly run.
  - **Machine Setup** – Cost of time spent to set up a machine to be used in a run

    For example, each time you set up the machine that paints the widget, wear and tear costs you .02 cents.
  - **Machine Run** – Cost of time spent to run a machine during assembly

    For example, each time you use the machine that paints the widget for an assembly run, wear and tear costs you .04 cents.
- **Overheads**
  - **Labor Setup Overhead** – Cost of overhead associated with labor to set up a run

    For example, this is the safety training expense incurred for an employee who sets up the machine used to paint the widget.
  - **Labor Run Overhead** – Cost of overhead associated with labor to run an assembly

    For example, this is the safety training expense incurred for an employee completes an assembly run.
  - **Machine Setup Overhead** – Cost of overhead associated with setting up a machine used in a run

    For example, this is the water expense incurred by running a machine during the machine set up.
  - **Machine Run Overhead** – cost of overhead associated with running a machine during assembly

    For example, this is the water expense incurred by running a machine during an assembly run.

To set up a cost category for Manufacturing Routing and Work Center:

1. To add choices to this list, go to Setup > Accounting > Setup Tasks > Accounting Lists..
2. Click **New**.
3. Click **Cost Category**.
4. Enter a name for the cost category. For example, US Labor Run Standard.
5. Select a cost type for this category. Choose from the following:
   - **Labor Run**
   - **Labor Run Overhead**
   - **Labor Setup**
   - **Labor Setup Overhead**
   - **Machine Run**
   - **Machine Run Overhead**
   - **Machine Setup**
   - **Machine Setup Overhead**

6. Check the **Inactive** box if you do not want this category to show in lists.

For information about creating a new cost category, see the help topic Creating Cost Categories.

Defining a Manufacturing Charge Item

With Manufacturing Routing and Work Center, when a specific routing operation is recorded, you can use items to define charges for the activity. For example, you can define the hourly cost of activities being performed, and the expense account the charges are logged against. To do so, you must set up the item record to define the item as a manufacturing charge item.

To define an item as a manufacturing charge item:

1. Go to Lists > Accounting > Items > New.
2. Click a link to create a charge item. You can track routing charges and expenses using the following item types:
   - Other Charge for Purchase
   - Service (for Purchase or for Resale)
3. Enter an **Item Name**.

   For example, Machine Run Time Cost.
4. If you use NetSuite OneWorld, select a **Subsidiary**.

   A manufacturing charge item can be associated with only one subsidiary.
5. On the item record, check the **Manufacturing Charge Item** box.

   This box cannot be cleared if the item is included in a cost template.

   You cannot check the **Include Children** box on the item record when the **Manufacturing Charge Item** box is checked.
6. Select a **Cost Category**.

   The cost category cannot be changed if the manufacturing charge item is included in a cost template.

   Only manufacturing charge items can use the labor and machine cost categories.
7. Enter an hourly rate up to 7 decimal places in the **Purchase Price** field.

   Charges are based on hourly rate (amount per hour).
8. Click the **Accounting** subtab.
9. Select the expense account these hourly charges should be logged against.
10. Complete any additional necessary fields.
11. Click **Save**.

A manufacturing charge item cannot be associated with a unit type even if you use the Multiple Units of Measure feature. For information, see the help topic Creating Item Records.

Creating Manufacturing Cost Templates

A manufacturing cost template is a list of rates that can be associated with completing a specific operation. The template defines the activities that occur and related costs to be recorded each time this step is completed.

For example, an employee works 10 hours on an assembly activity. A manufacturing operator needs to record the hours worked as a completion for this step. The cost template defines costs associated with the step completed: the rate for each activity, and what accounts these amounts should post to.

A manufacturing cost template streamlines tracking assembly process costs. It provides which rates and accounts are commonly used for each step in an assembly process.

Important: Including too many cost types on a manufacturing cost template may degrade NetSuite performance. Performance is compounded when multiple cost items are not related to production.

To create a manufacturing cost template:

1. Go to Lists > Supply Chain > Manufacturing Cost Template > New.
2. Enter a name for the template.
3. Optionally enter a memo. You can search for text you enter here to find this template later.
4. Check the **Inactive** box if you do not want this template to show in lists on forms and records. Clear this box if you do want this template to show in lists.
5. Select a cost category.

   For information about creating a cost category, see Defining Cost Categories for Manufacturing Routing and Work Center.
6. Select an item.

   Only items that have been marked as **Manufacturing Charge Items** show on this list.

   For more information, see Defining a Manufacturing Charge Item.
7. Enter rates up to 7 decimal places for this line item.
   - If this is a Setup category, enter a fixed rate. This is a one-time charge for a setup activity.
   - If this is a Run category, enter a run rate. This is an amount charged for each run completed.

   Note: Template creation performance is negatively affected when the number of lines on the cost templates is not kept to a minimum.
8. Click **Add**.
9. Repeat steps 5 through 8 for each category. Enter one category for each activity associated with this operational step.

   You can add only one of each of the following cost category types: Labor Run, Machine Setup, or Machine Run. However, you can add multiple categories for Overhead cost category types.
10. When all necessary categories have been added, click **Save**.

Cost Template Examples

A manufacturing cost template shows rates for many possible activities that are associated with an assembly step, such as the examples below:

Activity Type	Example	Rate Type	Rate Amount	Cost Category
Manufacturing Labor Setup Service	Warm up molding machine	Fixed	$10 per run	Labor Setup

Activity Type	Example	Rate Type	Rate Amount	Cost Category
Manufacturing Labor Setup Overhead	Facility rental	Fixed	$16 per run	Labor Setup Overhead 1
Manufacturing Labor Run Service	Costs to complete one run	Run	$14 per hour	Labor Run
Manufacturing Labor Run Overhead Service	Electric utility cost per run	Run	$13 per hour	Labor Run Overhead 1

Creating Manufacturing Work Centers or Groups

A work center is a group of people that perform a specific step in the manufacturing process. After you define a work center group, that work center can be assigned to cover specific steps in the manufacturing process. For example, your assembly process might require the following groups: manufacturing, quality assurance, and packing machine.

You create work centers by creating a static group, and then identifying it as a manufacturing work center.

To create a manufacturing work center:

1. Go to Go to Lists > Relationships > Groups > New.
2. Select **Static** as the kind of group.
3. Select **Employee** as the kind of members.
4. Click **Continue**.
5. On Create Static Employee Group page, enter a name for this group.

   For example, enter **Packing Machine Group**. This name shows in work center lists on records and forms.
6. Select the owner of this group.

   > **Note:** You are selected by default. Only the owner of a group can add or remove members or delete the group.
7. Check the **Manufacturing Work Center** box. This enables this group to be used as a work center with routing records.
8. Click the **Manufacturing Work Center Settings** subtab.
9. Select one or more locations to associate with this work center.

   If you use NetSuite OneWorld, you can select multiple locations within a subsidiary.
10. Enter the number of machine resources for this work center.

    If this machine is used in multiple work centers, enter a decimal amount. For example, if this machine is used by another work center for half the day, enter .05.
11. Enter number of labor resources for this work center.

    If labor is used by multiple work centers, enter a decimal amount. For example, if a welder spends only two hours in this work center in a day, enter .025.
12. Complete any additional fields necessary for this group record.
13. Click **Save**.

NetSuite uses the associated work calendar to schedule the operation tasks associated with each work center.

For more information about creating a static group record, read the help topic Creating a Static Group.

Work Center Calendars

For each work center, you can create a need-specific work calendar that represents the times the center is available to process work orders. Specified work center calendars enable you to manufacture products efficiently within time and resource constraints. For example, your work centers operate as follows:

- Work Center 1: Operates five days a week for eight hours
- Work Center 2: Operates four days a week for ten hours

Your production manager can set up a work calendar for each work center that specifies the hours available for each. Based on this work center calendar information, you have real-time visibility into total scheduling capacity. You also have intelligent manufacturing routing that calculates the processing time.

After you create the work calendar, specify that calendar on the work center record. Then, NetSuite can use the designated work calendar to determine the time when resources should be scheduled for associated manufacturing operation tasks.

Based on the requirement date, the supply planning engine determines the start date of a planned order. The supply planning engine uses backward scheduling, based on the work calendar assigned. The supply planning engine also considers work center calendars for forward scheduling when creating work orders.

To use work center calendars, complete the following steps:

- Setting Up a Work Center Calendar
- Assigning a Work Calendar to a Work Center

Setting Up a Work Center Calendar

Use the following procedure to set up a work center calendar.

To set up a work center calendar:

1. Go to Lists > Employees > Work Calendars > New.
2. Enter a name for the calendar.
3. On the **Working Days** subtab, define the working hours and days.
4. On the **Non-working days** subtab, define exceptions to the working days rules.
5. Click **Save**.

   For additional details, see the help topic Setting Up a Work Calendar.

Assigning a Work Calendar to a Work Center

Use the following procedure to assign a work calendar to a work center.

To assign a work calendar to a work center:

1. Go to Commerce > Marketing > Personalization > Groups > New (Administrator).
2. Click the **Static** button.
3. In the members list, select **Employee**.
4. Click **Continue**.
5. Check the **Manufacturing Work Center** box.

   This enables the **Work Calendar** field on the **Manufacturing Work Center Settings** subtab.
6. Click the **Manufacturing Work Center Settings** subtab.
7. In the **Work Calendar** field, select the appropriate work calendar from the list.
8. Click **Save**.

   Enter additional information, see the help topic Creating a Static Group.

Creating a Manufacturing Routing

A manufacturing routing is a template that contains a list of steps required to build an assembly item. Each step is in the order necessary to complete the operational sequence for completing the assembly.

After you create a routing record, that routing can be selected on a work order to direct the completion of the assembly. The routing determines the work center, cost template, labor resources, and machine resources that will be used during the assembly.

Routings are unique for each assembly item. However, routings can be shared across multiple locations.

To enter a manufacturing routing:

1. Go to Lists > Supply Chain > Manufacturing Routing > New.
2. Select the **Item** you are creating an assembly sequence for.
3. Enter one or more locations where this assembly will be performed.
4. Enter a routing template **Name**.

   This name appears in the list of routings in the **Manufacturing Routing** field on records and forms. For example, enter **Beta Alternate Supply Routing**.
5. Optionally, enter a **Memo**.

   You can search for the text you enter in this field. For example, enter **Use Beta Alternate** when primary widget supply is unavailable.
6. Check the **Default** box to use this routing by default for this item on forms.

   When you check this box, these routing steps will be used when new special work orders and mass created work orders are created.

   Clear this box if you do not want this routing to be used by default.
7. Check the **Inactive** box if you do not want this routing to show in routing lists on records and forms.

   Clear this box if you do want this routing to show in lists.
8. Check the **Auto-calculate Lag** box if you want NetSuite to calculate lag times for operation tasks.

   For more information, see Operations Overlap.

9. Click the **Routing Steps** subtab.
10. Enter the **Operation Sequence** number for the step you are entering.
11. For example, if you are entering the first step to be performed to build this assembly, enter 1.

    Sequence number determines dependencies between different operations. For example, operation 1 comes before operation 3 in the assembly process.
12. Enter the **Operation Name**.

    For example enter Assembly Setup.
13. Select a **Manufacturing Work Center**. This is the labor team that will complete this step.

    After you select a work center, the labor resources and machine resources are automatically entered from the work center record.
14. Select a **Manufacturing Cost Template** for this operation.
15. Enter the operation **Setup Time** in minutes.

    This is the amount of time required (fixed time per step) to prepare for this step in the sequence. For example, this could represent the time in minutes required to warm up a molding machine to bring the mold to the proper temperature.

    There is one setup time per order.
16. Enter the operation **Run Rate** in minutes.

    This is the amount of time required to complete a run and produce one unit.

    - NetSuite uses the **Setup Time**, **Run Rate** and the default calendar to schedule the completion of each step for work orders using this routing.
    - If you use the Demand Planning feature, NetSuite uses backward scheduling to determine the appropriate start date. There is one run time per base unit.
    - The **Setup Time** + **Run Rate** = total manufacturing task time.
17. If you did not check the **Auto-calculate Lag** box, set **Lag Type**, **Lag Amount**, and **Lag Unit**, as necessary.
18. Click **Save**.

Tip: You can create a new routing by clicking the **New Manufacturing Routing** button on the **Manufacturing** subtab of an assembly item record.

Standard Costing for Manufacturing Routing

If you use the Standard Costing and Manufacturing Routing and Work Centers features, NetSuite performs calculates the assembly cost. NetSuite incorporates the labor and machine costs, based on the default routing.

Standard Costing with routings requires the following:

1. **Cost Version**

   Verify that you have created a cost version.

   For more information, see Defining Cost Versions Defining Cost Versions.
2. **Planned Standard Cost Rollup**

   Run a cost rollup to calculate assembly cost. When you run a cost rollup, NetSuite checks for a default routing to calculate costs for the assembly. If you have no defined default routings, NetSuite uses the first routing created as the default routing to calculate the assembly cost.

Planned Standard cost is a consolidation of cost based on the component and cost category.

For subassemblies, each of the cost categories are rolled up to the next level in the Bill of Materials (BOM) hierarchy. The difference between the cost categories of this level and lower levels in the roll up depend on the items associated with the rollup.

Note the following when you review the cost of an assembly item based on the cost rollup. The lower level routing cost of building the subassembly is denoted with the subassembly item as a component on the planned standard cost record. The routing cost of building this level final assembly is denoted as follows. The Service and Other charge items appear as a component on the planned standard cost record.

For more information, see the help topic Standard Cost Rollup.

3. **Inventory Revaluation**

   When you use Standard Costing features, run update production cost to establish a standard cost in production.

   For more information, see the help topic Revalue Standard Cost Inventory.

Manufacturing Routing Cost Calculation

NetSuite calculates the cost of each step in a routing as follows:

- Part 1: Definition of Time / Quantity

  Total Setup Time = (number of resources x setup time)

  Total Run Time = (number resources x run time)

- Part 2: Rate

  Based on the manufacturing charge item, the quantity is the total hours required.

The total unit cost is derived at a component level per cost category and per operation sequence.

- Number of resources (from the work center) x Setup Time (from the routing record) x Manufacturing Charge Item Unit Cost (from the item record)
- Number of resources (from the work center) x Run Rate (from the routing record) x Manufacturing Charge Item Unit Cost (from the item record)

For more information about costing, see Manufacturing Routing Costing.

Manufacturing Routing and Work Orders

If you use manufacturing routing and work centers, you can use routings on work orders to manage your assembly process.

The routing you use on a work order is a template that describes the required steps to build an assembly item. The routing determines the work center, cost template, labor resources, and machine resources to use during assembly.

For more information, see Setting Up Manufacturing Routing.

To use routing on a work order:

1. Create a new work order.

For more information, see Entering an Individual Work Order.

2. In the Classification section select a **Location**.
3. If you use NetSuite OneWorld, select a subsidiary.
4. Check the **WIP** (Work In Process) box.

   When you designate a routing as WIP, NetSuite uses WIP accounting to issue materials in the designated WIP account.

   For more information, see the help topic Manufacturing Work In Process (WIP).
5. Select a **Manufacturing Routing** option.

   NetSuite displays the default assembly routing based on the location. However, you can select a different routing.

   For more information, see Creating a Manufacturing Routing.
6. Click **Save**.

   The following subtabs are displayed:

   - The **Items** subtab shows components that are issued.
   - The **Operations** subtab shows all operation tasks required for a particular assembly run.

     Operation tasks are created based on the routing. These tasks define the list of steps that must be completed to finish the assembly process. Tasks can be viewed and edited from the work order Operations subtab.

     For more information, see the following help topics:

     - Manufacturing Operation Tasks
     - Editing a Manufacturing Operation Task

Work Order Quantity Changes

If you change the assembly item quantity on the work order and then re-save it, the Operations subtab information updates to reflect the changes. For example, entering a higher quantity on the work order results in more required time to complete the run.

Routing and Time Zones

The associated work calendar applies for all routing work orders created.

- If you **do not use** NetSuite OneWorld, the schedule time zone is based on the time zone selected for the company.

  For more information, see the help topic Configuring Company Information.
- If you **do use** NetSuite OneWorld, the schedule time zone is based on the time zone of the subsidiary selected on the work order.

Planned Time Subtab

When you use Manufacturing Routing and Work Center and set the **Show Planned Capacity on Work Orders** preference, note the following. Work orders show a Planned Time subtab. This subtab details work allocated to each work center. In addition, NetSuite automatically generates planned time entries. For more information, see Setting Routing Preferences.

Manufacturing Operation Tasks

After you save a WIP work order that has a designated routing, manufacturing operation tasks are created based on the routing.

Each of these tasks is a step that must be done in order for the assembly process to finish. After work for the task has been done, manufacturing operators can log progress against each task on a work order completion form.

To view a list of operation tasks:

1. Go to Transactions > Manufacturing > Enter Work Orders > List.
2. Click **View** next to the work order.
3. Click the **Operations** subtab.
4. Optionally select a custom view for the operations list.

The list displays the following for each operation task:

- Operation Sequence
- Operation Name
- Predecessor
- Start Date
- End Date
- Input Quantity
- Completed Quantity
- Setup Time (Min)
- Run Rate (Min/Unit)

Click an operation name to open the task record.

Note: You can also modify tasks from the work order. Go to Transactions > Manufacturing > Enter Work Orders > List. Click Edit next to the work order to be edited. Then click the Operations subtab to view a list of operation tasks.

Add or Delete Tasks

On the Operations subtab of a work order, you can add a new operation task and you can delete an existing task. However, note that you can add or delete only the **last** task in the sequence. For example, you have operation tasks with these sequence numbers: 10, 20, 30, 40.

- You can add a new task with a sequence number 41.
- You **cannot** add a new task with a sequence number 21.
- You can delete task sequence number 40.
- You **cannot** delete task sequence number 20.

After task records are created, you can open and modify them individually. For more information, see Editing a Manufacturing Operation Task.

Operations Overlap

When you use the Manufacturing Routing feature, manufacturing planners can use the operations overlap function to schedule overlapping manufacturing operations. Overlapping of manufacturing operations can reduce work order lead times and allow more efficient utilization of manufacturing resources. When you set up operations to overlap, work order operations can be processed in a staggered method through the production cycle.

For example, a manufacturing routing requires two steps to complete a work order. However, work on Step 2 requires that only half of Step 1 is completed. Therefore, it is more efficient to start Step 2 when Step 1 is half-complete rather than waiting until it is 100% complete. This can be accomplished by defining overlap for operations on the routing record.

To use operations overlap, you must enable these features:

- Manufacturing Routing and Work Center
- Manufacturing Work In Process
- Work Order Completion

First, a planning operator defines how a subsequent operation can overlap an earlier operation. The lag amount can be based on time, quantity, or percentage on the manufacturing routing. After the defined portion of the first operation completes, the second operation automatically begins.

Define Lag on a Routing

The Lag Amount defines what portion of an operation needs to be completed before the next operation can start. It defines lag between beginning of an operation (run time) and beginning of consequent operation (setup time).

For each sequence of the routing, you can define a lag type using the following types:

- Time (in minutes)
- Quantity (in assembly units)
- Time Percentage
- Quantity Percentage

Autocalculate Lag

If you choose to autocalculate the routing, NetSuite can automatically calculate the optimal lag amount. The Optimal (Minimal) Lag Amount is the shortest possible lead time for each work order. Optimizing lag means that operations on a work order are scheduled strategically. This minimizes the lead time of the order and maximize the utilization of work centers within the work order.

To autocalculate lag amount, check the Auto-Calculate Lag box on the routing record. When you check this box, NetSuite disables the following fields in the grid:

- Lag Type
- Lag Amount
- Lag Unit of Measure

If you want to define the fields noted above, do not check the Auto-Calculate Lag box. If you choose to define these values, they default on work orders.

If lag settings are changed on the operation record, NetSuite reschedules the operation when the task is saved. The task reflects the new settings and reschedules all affected subsequent tasks.

When a work order is scheduled, NetSuite calculates the Optimal (Minimal) Lag Amount and Maximal Lag Amount for each operation. This is true if the operation has a preceding operation and defined lag type. Then, NetSuite does not allow the lag amount to be defined outside of this range.

The autocalculation setting can be changed only when the status of a work order is Planned or Released.

- When Auto-calculate Lag is enabled, lag amounts on operations cannot be edited.
- When Auto-calculate Lag is enabled, the only lag type available is Quantity.

After creation, click the Operations subtab on work orders to view the Start Date/Time and End Date/Time of each operation.

On the operation task record under the Predecessor section, the Lag Type and Lag Amount can be edited. After save, NetSuite validates that each lag amount entered falls between the Optimal (Minimal) Lag Amount and Maximal Lag Amount. If the lag amount entered is outside this range, an error displays the valid range.

Operations Overlap and Supply Plans

Because a supply plan generates supply plan lines for assemblies or work orders, calculations do account for lag related settings on the assembly routing. NetSuite verifies that the defined lag amounts fall in the valid range between the Optimal (Minimal) Lag Amount and Maximal Lag Amount. If not, the supply plan is automatically adjusted.

- If the lag amount defined on the routing is less than the Optimal (Minimal) Lag Amount, it is adjusted to the optimal lag amount.
- If the lag amount defined on the routing is greater than the Maximal Lag Amount, it is adjusted to equal the maximal lag amount.

Editing a Manufacturing Operation Task

For any work order with a status of **Pending Build**, you can make changes to operation tasks on the order. For example, due to specifications particular to one order, you may need to change information defaulted on tasks from the routing template.

After work is logged against the order and the status is In Process, you can no longer edit the operation tasks.

On individual task records, you can view the following:

- **Manufacturing charge items** – Charge items are derived from the routing template, but can be modified as necessary for individual orders.
- **Estimated time required for completion**

  When you enter a setup time or run time on the task record, these times are planned estimates and are used for scheduling. It is only after completion time is entered against a task is the actual time updated in the Actual Hours field.

Task dependencies are assigned based on the numeric order of the operation sequence and are not editable.

To edit operation tasks:

1. Go to Transactions > Manufacturing > Manufacturing Operations Tasks.
2. Click **Edit** next to the operation you want to modify.
3. Make changes, as required.

   For information about a specific field, click the field name to open Field Level Help.

   Note: When you modify task settings, labor and machine scheduling reflects calculations based on the new entries after you save the task changes.
4. Click **Save**.

You can also modify tasks from the work order. Go to Transactions > Manufacturing > Enter Work Orders > List. Click **Edit** next to the work order to be edited. Click the **Operations** subtab to view a list of operation tasks.

Work Centers and Manufacturing Operations Tasks

You can view the Manufacturing Operations Tasks list to process work orders based on work centers. This lets you see which centers have completed tasks that are predecessors for other tasks to be worked on.

You can view the operation tasks list and filter the list to show only tasks associated with Work Center 2. Customize the view to show the Predecessor and Predecessor Completed Quantity. These fields let you see which tasks Work Center 2 is due to work on next. (Create a custom view for the task list to display specific columns and information by clicking **Edit View**.)

For example, the task list shows that two work orders have tasks for which the predecessors are completed. You know that Work Center 2 needs to work on those tasks. When Work Center 2 finishes their requirement for the tasks, click **View** next to those tasks in the task list to enter completions. The completions entered then update associated work orders with new predecessor data. The work center task lists display the updated task statuses.

After completions are entered for tasks, scheduling is updated for labor and machines to reflect calculations based on the new entries.

For example, you complete work earlier than anticipated. Therefore, subsequent tasks move up and start and end dates reschedule to be earlier. However, if a completion reflects that work is falling behind, subsequent tasks move out and start and end dates reschedule to be later.

To view the operation tasks list:

1. Go to Transactions > Manufacturing > Manufacturing Operations Tasks.
2. Optionally filter the list by selecting a work center.

Manufacturing Task Scheduler

The NetSuite Manufacturing Task Scheduler provides a graphical view of operation tasks assigned and scheduled per work center. As a production planner or operations manager, you get a real-time view of each work center and their assigned operation task. You can quickly identify issues in how operation tasks are operated. Then you resolve these issues within the Manufacturing Task Scheduler. Use the task scheduler to simplify the monitoring and management of operation tasks to ensure they are being worked on efficiently.

The Manufacturing Task Scheduler enables you to:

- Identify work centers that are overloaded or underloaded.
- Reassign or reschedule tasks from overloaded work centers by dragging and dropping them to a different time slot or work center.
- Update the details of a work order on the Manufacturing Operation Task Detail form.

Availability

The Manufacturing Task Scheduler is available in the shared Supply Chain Management SuiteApp. For more information about this SuiteApp, see the Availability section of Supply Chain Management Reports. You may also contact your NetSuite account manager.

For information about installing the Supply Chain Management SuiteApp, see the help topic Installing Supply Chain Management.

Setting Up the Manufacturing Task Scheduler

Before you install the Manufacturing Task Scheduler, the following features and preferences are required:

1. Go to Setup > Company > Enable Features.
2. Click the **Items & Inventory** subtab, check the box for these two features:
3. Check the **Manufacturing Work In Process** box.
4. Check the **Manufacturing Routing and Work Center** box.
5. Go to Setup > Manufacturing > Manufacturing Preferences.
6. In the Production Execution section, check the **Show Planned Capacity on Work Orders** box.

   This preference correctly calculates and displays the summary bars, especially those with overlapping schedules.

For information on enabling features and preferences, see the help topic Enabling Features.

Install the Supply Chain Management SuiteApp

Install the Supply Chain Management SuiteApp with the following details:

- Bundle Name: Supply Chain Management
- Bundle Id: 47193

For instructions, see the help topic Installing Supply Chain Management. For information about installing bundles, see the help topic Installing a Bundle.

Supply Chain Management is a managed SuiteApp and is automatically updated whenever there are changes. Issue fixes and enhancements are available after the SuiteApp is updated in your account.

Roles and Permissions

The following table shows the list of required permissions to use the Manufacturing Task Scheduler:

Subtab	Permission	Level
Transactions	Work Order	Full

Subtab	Permission	Level
Lists	CRM Group	View
Lists	Work Calendar	View
Lists	Locations	View
Lists	Subsidiaries (for OneWorld Accounts only	View
Custom Record	SCM DPS Task View	Full
Custom Record	SCM DPS User Display	Full

By default, the following standard roles are granted full permissions to the two custom records that are listed in the table:

- CEO
- CFO
- Sales Vice President
- Accountant
- Accountant (Reviewer)
- Bookkeeper
- Warehouse Manager

In addition to the two custom records, ensure you assign the other permissions to standard or custom roles. To edit or customize a role, go to Setup > Users/Roles > Manage Roles. On the Manage Roles page, click the Role name to open the record and verify that the permissions are set to the required level. For more information about editing or customizing roles, see the help topic Customizing or Creating NetSuite Roles.

Based on your role, you can access the Manufacturing Task Scheduler by following the appropriate path:

- Warehouse Manager

  Inventory >Manufacturing> Manufacturing Task Scheduler
- Administrator

  Transaction>Manufacturing> Manufacturing Task Scheduler
- Executive or Accounting

  Financial > Manufacturing> Manufacturing Task Scheduler

Views, Filters, Colors of the Manufacturing Task Scheduler

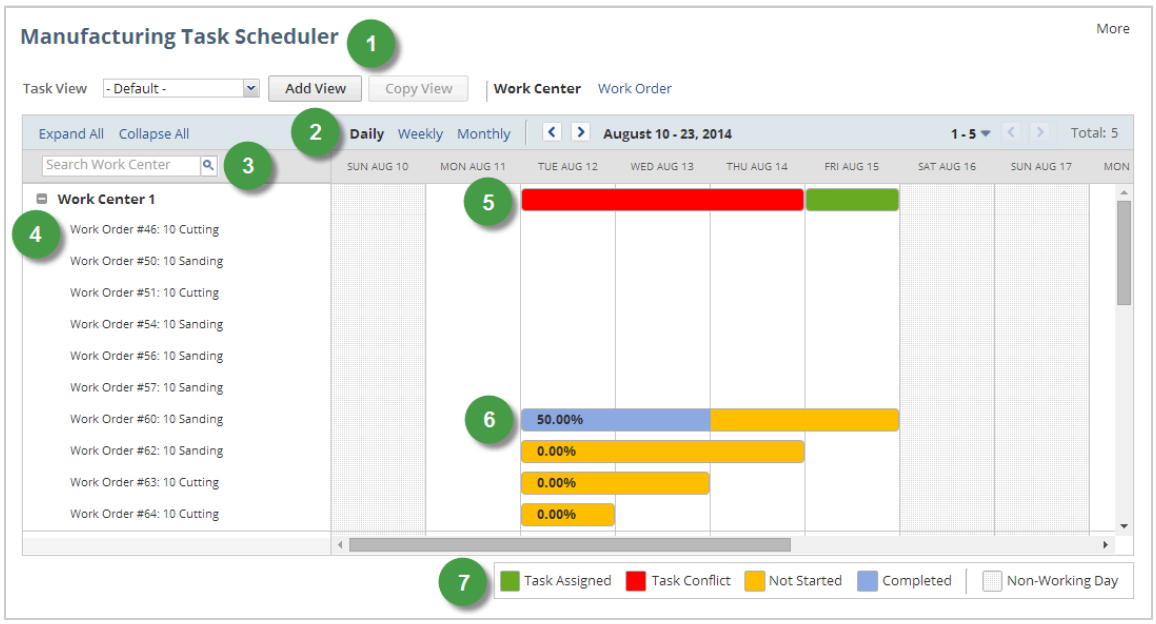
The Manufacturing Task Scheduler page contains the chart, work center list, the task view filter, and the time period bar. On the left pane, view the list of work centers with the manufacturing operation tasks that correspond to their work order. On the chart, the task bar represents each task under a work order. You can determine the schedule, duration and status of a work order from its task bar. The summary bar across each work center provides a quick view of all its assigned work orders. To help you understand the color-coded status of summary and task bars, refer to the legend at the bottom right.

View the following topics for the correct usage of the Manufacturing Task Scheduler:

- Task Views
- Time Period Bar

- Switch Work Views
- Search for a Work Center
- Decode the Status Colors

See the following figure and table to learn the sections and tools of the Manufacturing Task Scheduler.



No.	Control Name	Description
1	Task View Filter	Enables selection of the default or custom view
	Add View	Adds a new custom view
	Copy View	Copies an existing custom view
	Work View options	Switches the work view: Work Center or Work Order
2	Expand All/Collapse All	Displays all or hides all tasks within a work center or work order
	Time Period	Changes the time period displayed on the chart: Daily, Weekly, Monthly
	Date Range	Displays the start and end date of a time period
	Date Range icons	Moves the start date from the previous or next date
	Pagination	Enables selection of a page range
	Page Range icons	Displays the previous or next page
	Page Count	Displays the total number of pages
3	Search Work Center	Enables searching of a work center
	Chart Header	Displays the specific day, week, or month within the current date range
4	Manufacturing Operation	Displays the list of tasks within a work center or work order
5	Summary Bar	Represents all tasks on the chart assigned to a work center or work order
6	Task Bar	Represents a specific task on the chart

No.	Control Name	Description
7	Legend	Provides a short description of each color on the summary and task bar

Task Views

The default Task View displays all your work orders, excluding work orders on **Planned**, **Built**, and **Closed** Status, and those from the subsidiary. Use the default view or create a custom view if you need to closely monitor a specific set of tasks. When creating a custom view, set your preferences for any of the following filters:

- Production Date From and To
- Subsidiary
- Location
- Work Center
- Work Order Status

Note: The Manufacturing Task Scheduler can display only a maximum of 2000 operation tasks per page. Creating a custom view can be helpful in limiting the number of tasks to display on the chart.

On the Task View Filter bar, the **Add View** button appears only on the default view. The **Edit View** and **Copy View** buttons appear only on a custom view. The following instructions describe how to use any of these task view controls.

- **To add a view**

  To create a custom view, click **Add View**. Assign a name to the view and select your preference for any of the filters.

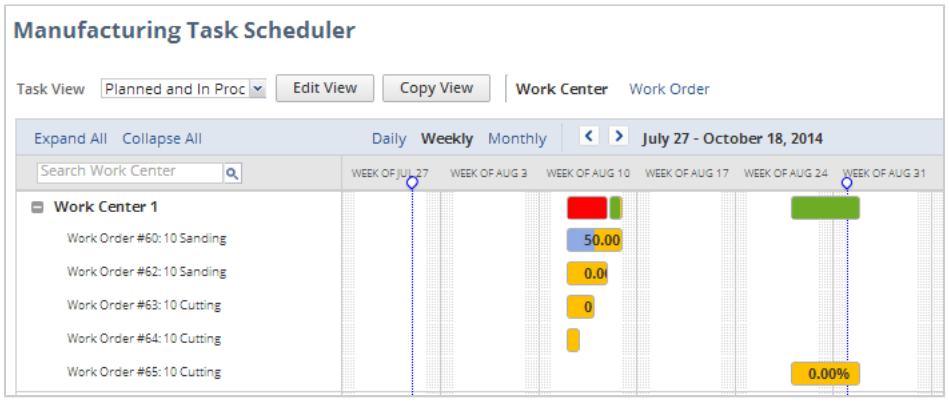
- **To edit a view**

  To make changes to a custom view, select the name of the view and then click **Edit View**. The current preferences for the selected view are displayed on the form, which you can change or update.

- **To copy a view**

  To make a slight variation of an existing view, use the **Copy View** option.

For custom views with a specified date range for the production start date, the start and end of the range appear with vertical bars. All production start dates that fall within the range appear inside the bars.



On the sample screenshot, the vertical bars on the chart are placed on the week of July 27 and August 31. The production start date of all tasks fall within the vertical bars, and the date range.

Time Period Bar

On the time period bar, click any of the period options to change the current chart view. Changing the time period adjusts the entries on the date header above the chart:

- **Daily**: shows the day, month, and date on the date header. A total of 14 days appear at a time.

  On the Daily chart, task bars cover the entire day, regardless of the number of work hours.
- **Weekly**: shows the month and date of the first day of the week, on the date header. A total of 12 weeks appear at a time.
- **Monthly**: shows the month and year on the date header. A total of 6 months appear at a time.

Based on your selected time period, the date range automatically adjusts. The date range displays the start and end date of the current period covered, for the daily and weekly time period. When you select the monthly option, it displays the start and end month with the year.

The previous or next icon (beside the date range) moves the start and end date or month before or after the current selection, respectively. This automatically adjusts the date header and chart view.

Switch Work Views

Beside the task view controls, click either the Work Center or Work Order link to change the operation task grouping on the left pane. By default, the left pane displays the Work Center view where operation tasks appear under their assigned work centers. You can switch to the Work Order view to see all tasks that belong to each work order.

In Work Order view, you can also see the assembly item of each work order and the work center where the task is assigned. The pagination at the right side of the time period bar represents the number of work orders on the current page. To go to a specific work order, select from the range of work order numbers. On the chart, the summary bar across each work order represents all tasks under it.

Note: You cannot reassign and reschedule tasks through drag and drop of the task bars. You must switch back to Work Center view to update the tasks directly on the chart.

Search for a Work Center

On the Work Center view, use the search tool to search for a work center that does not appear on the current page. Enter the complete or partial Work Center name as search criteria. Press Enter on your keyboard, or click the search icon to start the search. Only the retrieved work center and its assigned work orders appear on the chart.

Note: At least 3 characters are required as search criteria.

To return to the initial list of work centers, remove any criteria on the search tool, and then click the search icon.

Click the Expand All or Collapse All links to display or hide the work orders of all work centers at the same time. This expands or collapses work centers across all pages, and persists when you move from one page to another.

When work centers or work orders are collapsed, the chart displays only the summary bars. Summary bars are useful in the following ways:

- You can compare the summary bars across all work centers or work orders.

- In the Work Center view, displaying only the summary bars highlights any overloaded or underloaded resource.

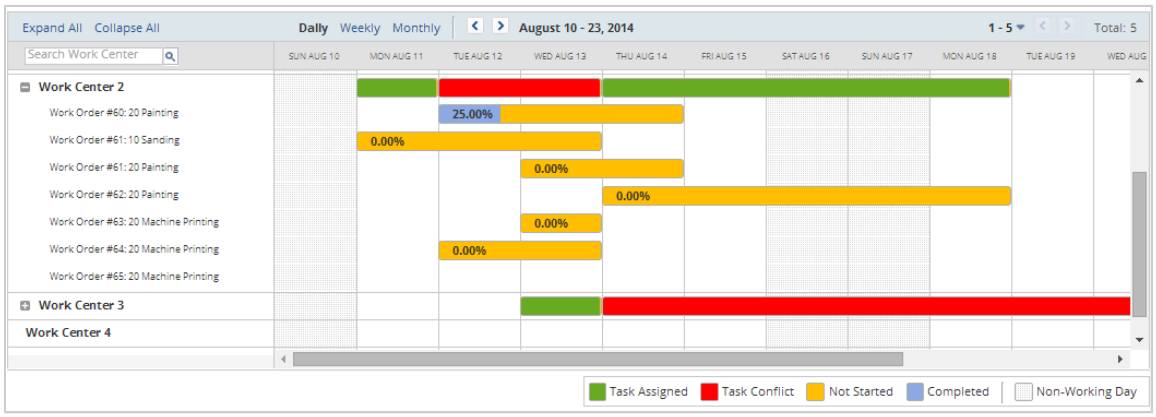
You can also use the pagination controls at the right side of the time period bar to help in searching for a work center. It displays the current number of work centers displayed on the page. Click the down arrow to view and select another page. Use the previous and next arrows to move from one page to the next.

The Manufacturing Task Scheduler can display a maximum of 20 work centers or work orders per page.

Decode the Status Colors

The color of the task bar indicates the current status of a task as seen in its operation task record. Any status change that is made on the record is reflected on the bar. The initial task status is **Not Started**, in yellow. When it is **In Progress**, the percentage of task completion appears in blue, and the rest of the task bar remains yellow.

All work orders are represented on the summary bar across each work center, in green. You can check for conflicting tasks with overlapping schedules, which appear in red.



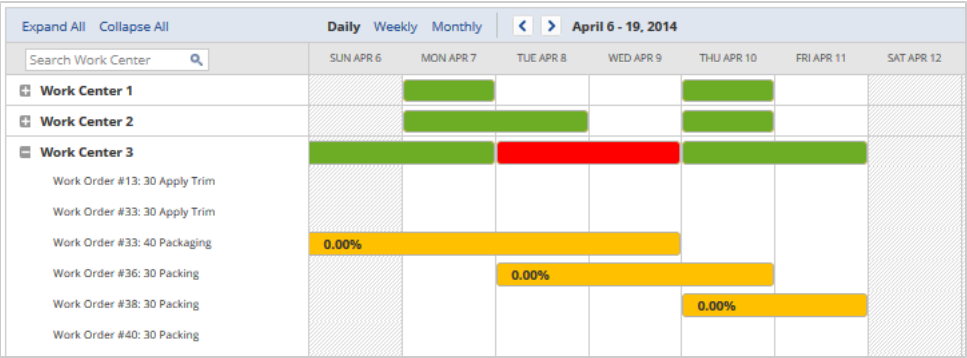
Check the color codes on the legend bar. Use the following table as a guide to the definition or description of colors used in the task bar, summary bar, and chart.

Color	Definition
Green (Task Assigned)	Summary bar color that indicates an assigned task
Red (Task Conflict)	Summary bar color that indicates one or more tasks with overlapping schedules
Yellow (Not Started)	Task bar color that indicates a task that has not started
Blue (Completed)	Task bar color that indicates a task's percentage of completion
Gray (Non-Working Day)	Column color that indicates a non-working day

Task Conflicts

On Work Center view, the summary bar displays all operation tasks assigned to a work center. The summary bar can display a task conflict in red, if two or more overlapping tasks exceed the total working hours per day.

The sample screenshot shows overlapping tasks in conflict for April 8 and 9, but not for April 10. This is derived by comparing the duration of all tasks for a certain day against the total working hours allotted for the work center.



The following table shows the duration or working hours for each task and the total duration per day. You can see how the overlapping tasks are shown as such in the summary bar. For April 8 and 9, the total task duration exceeds the allotted 8 working hours for Work Center 3.

Work Center 3: Total working hours per day = 8.

	April 8	April 9	April 10
Work Order #33: 40 Packaging	8	2.1	
Work Order #36: 30 Packing	7.33	8	1.83
Work Order #38: 30 Packing			2.5
Total task duration per day	15.33	10.1	4.33

The duration is indicated in the planned time details of a work order. To view the duration of tasks in a work order, go to Transactions > Manufacturing > Enter Work Orders > List. On a specific Work Order page, view the duration on the **Planned Time** tab. For more information, see Manufacturing Routing and Work Orders.

On the chart, you can adjust the schedule of a task, or reassign a task to another work center to resolve a task conflict. For more information, see Update Tasks Using the Manufacturing Task Scheduler.

Update Tasks Using the Manufacturing Task Scheduler

By looking at the summary bar of a work center, you can check for overlapping tasks, indicating that a work center is overutilized. In this case, you can schedule a work order to a later date, or assign it to another resource. You can perform the following updates or changes to a task using the Manufacturing Task Scheduler:

- Reassign a Task
- Forward Scheduling on the Manufacturing Task Scheduler
- Backward Scheduling on the Manufacturing Task Scheduler
- Update a Task Record

Note: You can update tasks directly on the chart only when you are on the Work Center view. Use the task view filters to limit the view to specific work centers where the reassignment or rescheduling are going to be performed.

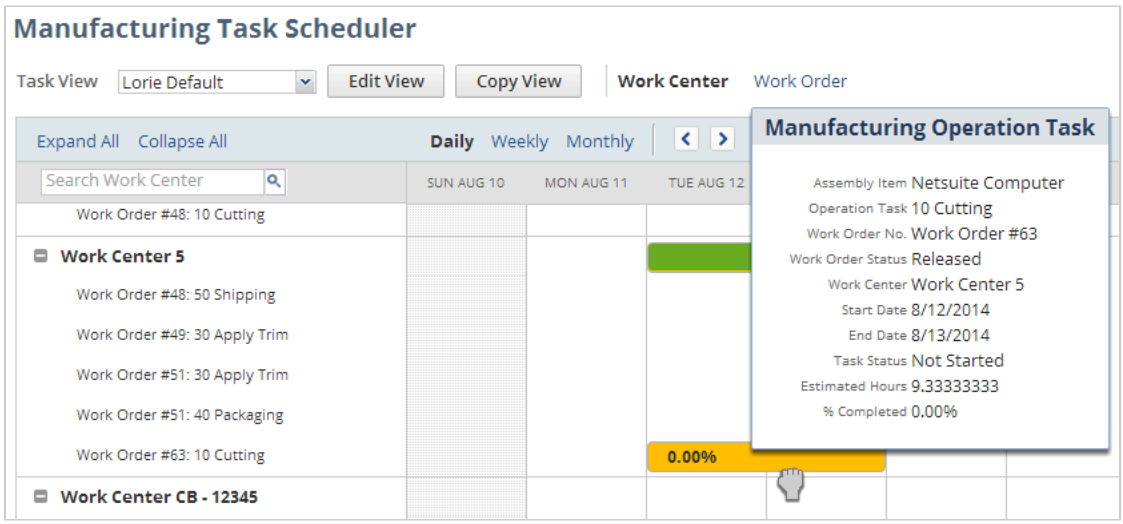
For more information about task conflicts, see Task Conflicts.

When you update the chart, appropriate icons appear to inform you which tasks can be reassigned and updated. Refer to the list of icons used on the chart:

- : This lock icon on the cursor indicates that the task is not open for reassignment or rescheduling.
- : No lock on the cursor means that the task can be transferred to another chart location.
- : This icon indicates that the task can be transferred to the new chart location.
- : This icon indicates that the task cannot be transferred to the new chart location.

You can also check the work order status of the task to determine if the details can be updated or changed. Only tasks with **Planned** or **Released** work order status can be updated.

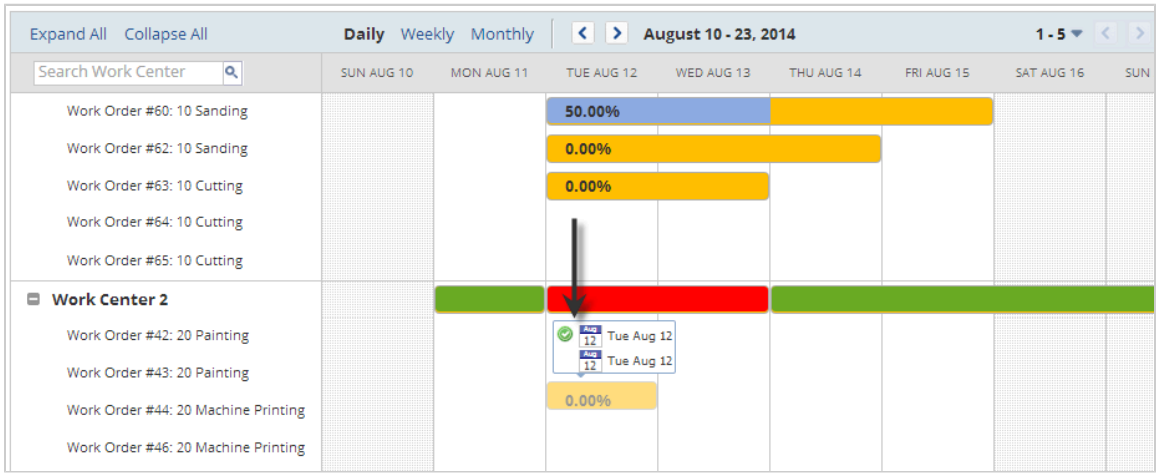
To check the work order status, place the cursor on the task bar to display specific details from its manufacturing operation task record.



Reassign a Task

To reassign a task, drag the task bar upward or downward within the same column, toward the new work center.

Note: You cannot reassign a task to an inactive work center, or one that belongs to a different subsidiary.



As you drag the task bar, the check icon appears beside the start and end dates. This indicates that you can drop the task onto the specific chart location on the new work center. The reassigned task retains all its details, except for the new work center number.

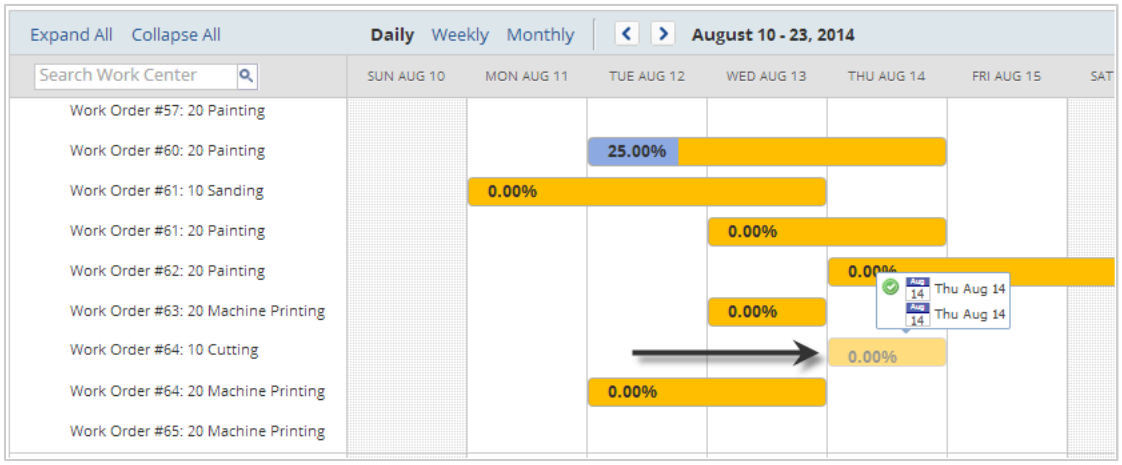
Forward Scheduling on the Manufacturing Task Scheduler

To perform forward scheduling on the chart, change the start date of the first task in the work order. This applies to work orders set to **Forward** scheduling method. For information about scheduling methods, see Production Scheduling Methods Overview.

Set your chart to the Work Center view to start forward scheduling. To locate the first task in the work order, the sequence number located beside the work order number is first in the operation process. To move the schedule to a different date, drag the task bar to the left or right of the original start date (same row). You can drop the task to the new location when you see the new start date appear with a check icon.

Note: Select the appropriate time period option to locate a new date on a different week or month. Use the previous and next date range arrows to adjust the dates on the view.

After you move the date of the first operation task, NetSuite automatically adjusts the schedules of the succeeding tasks. Switch to the Work Order view to review the new schedule of tasks within the work order. NetSuite applies the changes made on the chart to the work order and operation task records.



Backward Scheduling on the Manufacturing Task Scheduler

Backward scheduling on the chart applies to work orders set to the **Backward** scheduling method. To perform this, move the end date of the last operation task in the work order. Changes to the schedule appear on the corresponding work order and operation task records. For more information about scheduling methods, see Production Scheduling Methods Overview.

To start backward scheduling, set your chart to the Work Center view by clicking its link located above the chart header. On the left pane, look for the last operation task of the work order to be rescheduled. On the chart, drag and drop the task bar of the last operation task to the new date.

- Drag to the right of the current date to move the schedule to a later date.
- Drag to the left of the current date to move the schedule to an earlier date.

When the last operation task bar has a new date, NetSuite automatically adjusts the preceding tasks to accommodate the new schedule. You can review the new task schedules by switching to the Work Order view.

Update a Task Record

You can update a task record, but after you change a task to **In Progress** status, you cannot edit its details. To display the manufacturing record, double-click its corresponding task bar on the chart. You can edit the following details:

- Setup Time
- Run Time
- Work Center
- Machine Resources
- Labor Resources

After you change a record, any adjustments to the time or date automatically appear on any dependent fields. For more information about editing the task details, see Editing a Manufacturing Operation Task.

Limitations

Take note of the following limitations when using Manufacturing Task Scheduler:

- The Manufacturing Task Scheduler does not support the following date formats for specific languages:
  - Chinese (Simplified)
    - YYYY M D
    - YYYY MM DD
  - Dutch
    - D. MMM YYYY
    - DD. MMM YYYY
  - Vietnamese
    - D MONTH, YYYY
    - DD MONTH, YYYY

Supply Planning and Routing

If you use the Demand Planning and Manufacturing Routing and Work Center features, routings on work orders can affect your supply planning. This is because supply planning uses backwards scheduling to meet manufacturing due dates.

Note: Procurement lead times do not affect these time requirement calculations.

The supply planning method used depends on whether a default routing is identified.

Without a Default Routing

When you generate a supply plan on the Generate Supply Plan page, NetSuite calculates the order date (or release date). NetSuite bases the calculation on the due date using the following formula for assembly items that are required to be built:

Order Date = Due Date – (Quantity x Work Order Lead Time)

- Quantity = Quantity of items required
- Work Order Lead Time = Number of days required to build, per unit

- Due Date = Date when the additional supply is required

Note: Without a default routing, NetSuite makes calculations without reference to any calendar or resource requirements.

With a Default Routing

When you use Manufacturing Routing and Work Center, the supply planning engine considers the default routing and associated work calendar for scheduling purposes.

When an assembly build is required and a default routing is defined, NetSuite calculates the cumulative lead time across all operation sequences. NetSuite uses the following formula:

Total time =

[Sum of Setup Time for all operation tasks + (Sum of Run Rate x Quantity)] x Total Hours per day

Note:

- Setup Time = Total cumulative setup time across all operation sequences in the default routing
- Run Rate = Total cumulative run time across all operation sequences in the default routing
- Total Hours per day = Total number of hours available on the associated work calendar

NetSuite calculates the order by backward scheduling from the due date. NetSuite does consider the associated work calendar for days available, including holidays.

If changes are made to the associated work calendar or to the routing record, you should regenerate the supply plan. These changes can include:

- modifying the work calendar (such as to increase/decrease the working days or add/remove holidays)
- editing the routing to increase/decrease a setup time or run rate

After regeneration, NetSuite modifies the order dates to reflect the new requirements and still meet the due date deadline.

Routings and the Generate Work Order in Supply Plan Preference

NetSuite supply plan processing for an assembly with a routing defined depends on your setting for the Generate Work Order in Supply Plan preference.

Generate Work Order in Supply Plan Setting	Default Scheduling Method	Result
Do Not Generate	—	The supply plan uses backward scheduling to determine order date. In this case, NetSuite creates only the supply plan line, not the Work Order.

Generate Work Order in Supply Plan Setting	Default Scheduling Method	Result
Not Do Not Generate	Forward	The supply plan uses backward scheduling to determine the order date. Within the supply plan run, NetSuite automatically creates a work order, and sets the production start date the same as the order date. When the work order is created, NetSuite uses forward scheduling to calculate the work order production end date and sets the production start date. In this case, the supply plan creates an order.
Not Do Not Generate	Backward	NetSuite creates a work order using the receipt date from the demand plan. The production end date is set at one day prior to the receipt date. This allows time to complete production and be available on the required date. The work order uses backward scheduling to calculate the work order production start date. In this case, the supply plan creates an order.

For information about setting the Generate Work Order in Supply Plan preference, see Setting Routing Preferences.

Production Scheduling Methods Overview

When you use the Routing and Demand Planning features to generate supply work orders, you choose the method NetSuite uses to calculate production requirements. These calculations assess the time, materials, and resources required to complete an order and set a start or end date for the production run.

Forward Scheduling

Forward scheduling lets you set a production start date. Then, NetSuite calculates the time, materials, and resources required to complete all necessary operations to finish the task. The production end date is determined based on these calculations.

When using the Forward Scheduling method on work orders, the Production Start Date field is required and defaults to the current date. The Production End Date field is dimmed because it will be calculated.

Backward Scheduling

When you use Backward Scheduling, you set the production end date, which is the date you need to have the completed items. Based on data from the associated routing and related work center calendar, NetSuite calculates the time, materials, and resources required to complete all operations. NetSuite determines the production start date based on these calculations.

When you use Backward Scheduling on work orders, the Production End Date field is required. The Production Start Date field is dimmed because it is automatically calculated.

Note: This calculated start date may be a date in the past, prior to the current date.

When Backward Scheduling is set as the default scheduling method, different factors determine the production end date on generated work orders. For more information, see Backward Scheduling.

These scheduling methods can be used when generating individual work orders and by generating work orders using supply planning.

When a work order is saved, or generated, the supply planning engine calculates requirements and then generates necessary work orders. On the work order Operations subtab, click an operation name to view or edit details about the operation.

To choose a production scheduling method, you must first set these preferences:

Generate Work Orders in Supply Planning

To set production scheduling methods on work orders, you must first set the preference to Generate Work Orders in Supply Planning. For information about this preference, see Automatically Generating Planned Work Orders. After you set this preference, you select a scheduling method on orders and set a default scheduling method. When you this preference, the supply plan schedules work orders based on the default scheduling method.

Setting a Default Scheduling Method

A default production scheduling method appears by default in the Scheduling Method field on work orders created manually and by automated supply planning.

To set default scheduling method:

1. Go to Setup > Manufacturing > Manufacturing Preferences.
2. In the **Production Planning and Scheduling Allocation** section, **Default Scheduling Method** field, choose either **Forward** or **Backward**.

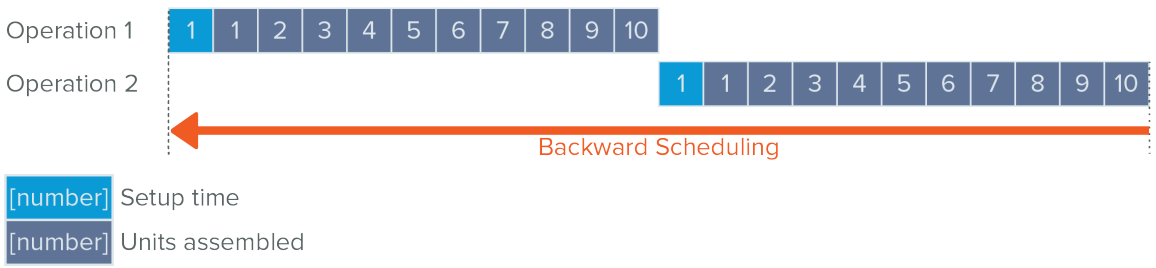
   This field defaults to the Forward scheduling.
3. Click **Save**.

This method you select automatically completes work orders. However, you can change the method on individual orders with a status of Planned or Released.

Backward Scheduling

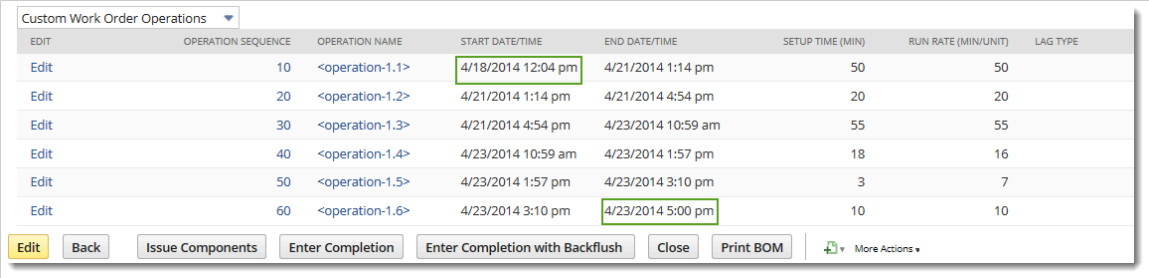
When you use the backward scheduling method for production planning, you set the production end date. This is the date you need to have the completed items. Based on data from the associated routing and related work center calendar, NetSuite calculates the time, materials, and resources required to complete all operations. NetSuite determines the production start date and time based on these calculations.

For example, you need to schedule an order of widgets that requires two operations to complete a production run. Each operation requires 1 day of setup time and 10 days of production time. Operation 1 must be complete before Operation 2 can start. These production requirements appear in the following illustration:



When you enter the items completed date, NetSuite calculates the day work must begin to complete production on time. When a work order is created by a supply plan, NetSuite schedules work so that the last operation is completed before the due date. The due date time is 00:01 AM. Therefore, the last operation on the work order is scheduled for completion by 11:59 PM on the day before the due date.

The time displayed for each operation is based on work hours set for each work center. For more information, see Creating Manufacturing Work Centers or Groups.



Planners who use the Backward Scheduling method can reduce waste of manufacturing resources because NetSuite calculates start dates automatically. Work order production is scheduled to start as late as possible, giving planners flexibility to cancel or change an order.

Note: The NetSuite planning engine calculations may set a production start date in the past, depending on the end date entered.

Production work is not automatically reallocated based on resource capacity. After work orders are created, you may need to assess resource assignments.

When Backward Scheduling is used as the default scheduling method, the production end date on generated work orders is determined using the following factors:

- **Sales Order** - The box in the **Create WO** column on the **Items** subtab is checked. This is true for an item that uses the WIP multi-step production process. A work order is generated for your assembly item. The production end date on the work order is set to one day before the expected ship date on the work order. If no expected ship date is entered, the production end date is set to the same day as the sales order date.
- **Work Order** - The box in the **Create WO** column on the **Items** subtab is checked. A work order is generated for a sub-assembly. The sub-assembly's production end date is set to the same date as the parent item's production start date.
- **Supply Plan** - A work order is generated during a supply plan. The production end date for a sub-assembly is set to the same date as the parent item's production start date.

  Important: The **Generate Work Orders in Supply Planning** preference must be set to any option except **Do not Generate**.
- **Mass Creating Work Orders** - **Reorder point** is the Replenishment Method. NetSuite uses Forward Scheduling for the work orders regardless of the default scheduling method set in the account preferences.

Manufacturing Routing Completions and Time Entry

For work orders that use manufacturing routings, enter time and completions against the operation tasks to track assembly process and monitor scheduling and costs. The following help topics provide details about completions and time entry:

- Routing Work Order Completions
- Routing Completion Labor and Machine Time Entry
- Time and Status Updates on Tasks

Routing Work Order Completions

After an assembly task completes, record a completion against the operation. The completion logs time and activities against the operation. When you update work order records helps you track costs and expenditures up to the current point in time. You can enter a completion in the following ways:

- Enter a Completion from a Work Order
- Enter a Completion on a Task Record
- Bulk enter completions (See Entering Work Order Completions).

After you enter an operation task completion, on the record, click Actions > GL Impact to see completion effects on the general ledger. The GL Impact page shows the overheads and labor expenses recorded against the WIP account.

When you mark the final task work for an assembly completed, saving the completion records the items as put into inventory. When you view the GL Impact page, the value is removed from the WIP account and added to the inventory account.

You can set a preference for completion validation. For more information, see Completion Validation Preference.

Enter a Completion from a Work Order

When you use the completion buttons on a routing work order, you can choose from the following options:

- **Enter Completion** (completion only)

  Records one of the following:

  - completion of a single operation or a range of operations
  - completion of entire assembly
- **Enter Completion with Backflush** (completion + issue components)

  Records one of the following:

  - completion of a single operation or a range of operations **AND** issue components
  - completion of entire assembly **AND** issue components

> **Note:** When a completion and issue occurs and the status is not closed or built, the operation status automatically changes to in-progress.

For detailed steps on entering a completion from a work order, see Entering a Completion for an Individual Work Order.

Enter a Completion on a Task Record

You can open the complete list of task records to enter a completion for an operation task.

To complete an operation task record:

1. Go to Transactions > Manufacturing > Manufacturing Operations Tasks.
2. Click **View** next to the completed task.
3. On the operation task record, enter the completed quantity.

   After you enter the quantity, NetSuite automatically enters data on the **Components** subtab and **Operations** subtab based on the necessary requirements.

   For more information, see Routing Completion Labor and Machine Time Entry.
4. Click **Save**.

Completion Validation Preference

You can set a preference to validate that routing operation sequences are always followed in accordance with the work order. NetSuite uses this validation to ensure that the correct quantity is completed for each operational step before permitting the work order to continue processing. This preference restricts the completed quantity amount you can enter on a work order completion for a particular operation. Such verification helps prevent problems due to out-of-sequence processing.

Choose one of the following settings for the **Check Completed Quantity in Prior Operations During Operation Completion** preference:

- **No Verification** – Choose this setting if you do not want to receive verification warnings.
- **Require Confirmation before Saving** – Choose this setting to receive verification warnings. NetSuite permits the completed quantity to be greater than the predecessor completed quantity after the warning is acknowledged.
- **Do Not Allow Saving** – Choose this setting to require that the completed quantity is not greater than the predecessor completed quantity.

Note: This field defaults to **No Verification**. If you do not change this default setting, unverified completions can be entered. For more information about setting this preference, see the help topic Order Management Accounting Preferences.

For example, completing Operation B requires a set amount of items that are generated during Operation A. You can verify that the requirements of the predecessor have been met before saving the completion for Operation B.

- Creating 5 units during Operation A is a predecessor for creating 5 units during Operation B.
- You choose the preference setting **Do Not Allow Saving**. The total completed quantity of Operation B cannot be greater than the total completed quantity of Operation A.
- Operation B requires 5 units that are created during Operation A. NetSuite verifies that 5 units are completed during Operation A before Operation B can begin.

For orders completed across multiple days or shifts, partial quantities can be logged over time.

Operation	Qty Day 1	Qty Day 2	Qty Day 3	Qty Day 4
Operation A	50	30	15	5
Operation B	40	40	5	15
Operation C	35	45	0	20

Routing Completion Labor and Machine Time Entry

Enter a routing work order completion enables you to record labor and machine time completed against an operation task. For more information, see Routing Work Order Completions.

Entering data on the completion form enables you to define the following information:

- **Starting and Ending Operation** - The completed operation tasks.
- **Quantity Completed** - The amount of time to be logged against each operation.

The Operations subtab shows which operations are being completed and the amount of labor and machine time to record against each operation.

Identify Completed Operations

1. Enter the **Starting Operation**.

   The first operation task you want to identify as being completed.
2. Enter the **Ending Operation**.

   The last operation task you want to identify as being completed.

   Operation tasks logged as completed include the indicated starting operation, the ending operation, and all operation tasks in between the starting and ending tasks.
3. Enter the **Completed Quantity**.

   NetSuite uses this quantity to calculate the amount of labor and machine time for completed sequences .

   Note: Enter the completed quantity in the Operation Completion section of the form. The Completed Quantity field on the Operations subtab is read–only.

For example, enter a completed quantity of 1, with the starting operation of 10, and ending operation of 30.

Operations 10, 20, and 30, the completed quantity is multiplied against the labor and machine time requirements set on the operation task record. The labor and machine time fields on the Operations subtab are populated.

Labor Time and Machine Time for Completed Operations

After the operations marked as complete are identified, you can enter details about labor and machine time for each operation.

The Operations subtab can be used as follows for each operation completed:

- Completed Quantity displays the amount entered in the Completed Quantity field.
- To record Setup Time:
  - If you have not recorded an operation setup time against an operation, the setup columns display the full operation setup time. Time is based on the setup time defined on the operation task record.

    Check the **Record Setup Time** box.

    For each operation, you have the following options:
    - Modify the default setup time quantity.

    - Clear the Record Setup Time box.
- NetSuite automatically enters machine and labor run times for each operation based on the quantity completed using the following formula:

  Default run time = Qty completed x Run rate on the operation record

After the system enters labor and machine times for all completed operation tasks, NetSuite calculates the progress and costs of the assembly.

- For more information, see Time and Status Updates on Tasks.
- For more information, see Manufacturing Routing Costing.

Time and Status Updates on Tasks

Time entered against an operation task ensures scheduling for all related tasks are updated to accurately portray progress against each operation.

Often machine and labor resources working concurrently are fully used against a certain operation task. In such cases, both resource types are weighted equally to determine the true time recorded on the operation task record.

Sometimes, one resource may have a higher value than the other resource for a certain task. For example, on a task, the machine run time is less than labor run time. In such a case, the critical path is the labor time because it is the greater of the two. NetSuite updates the production schedule based on the larger requirement of the two. This applies to setup time and run time.

In another example, the recorded machine time is larger than the labor time because the machine can run without constantly being overseen by labor. In this case, the machine time is the critical path, and NetSuite uses it to update scheduling. NetSuite uses the labor time for costing purposes.

For an operation, if the labor run time is larger than the machine run time, NetSuite uses the labor run time as the true hours.

Note: The default values that show for machine run and labor run times can be modified to accommodate individual run times.

After the appropriate time values are determined, the amount appears in the **Actual Hours** field on the operation task record. Based on the hours recorded, NetSuite adjusts the schedule of subsequent tasks to provide a realistic view for completions.

Operation Task Status Updates

NetSuite updates the status of an operation task based on data entered for the work order or tasks. Possible status options include the following:

- **Not Started**
  - No time is recorded against the task.
  - No quantity completed is recorded on the task.
- **In Progress**
  - Some time is recorded against the task.
  - Some quantity completed is recorded on the task **and** the completed quantity is less than the input quantity required.

- **Completed**
  - The completed quantity is equal to or greater than the input quantity required **or** the work order is closed.

Mark a Routing Work Order as Built or Closed

For some orders, you may want to show the items as being assembled without finishing all the individual steps for each operation task. In such a case you can do one of the following:

- **Mark an Order Built**

  When you mark an order as built, the required items are marked built and added to inventory. Note that associated variances **are not** created.

  To mark a work order built, go to Transactions > Manufacturing >Mark Work Orders Built.

  For more information, see Marking Work Orders Built.

- **Mark an Order Closed**

  When you mark an order as closed, the required items are marked built and added to inventory. Note that associated variances **are** created.

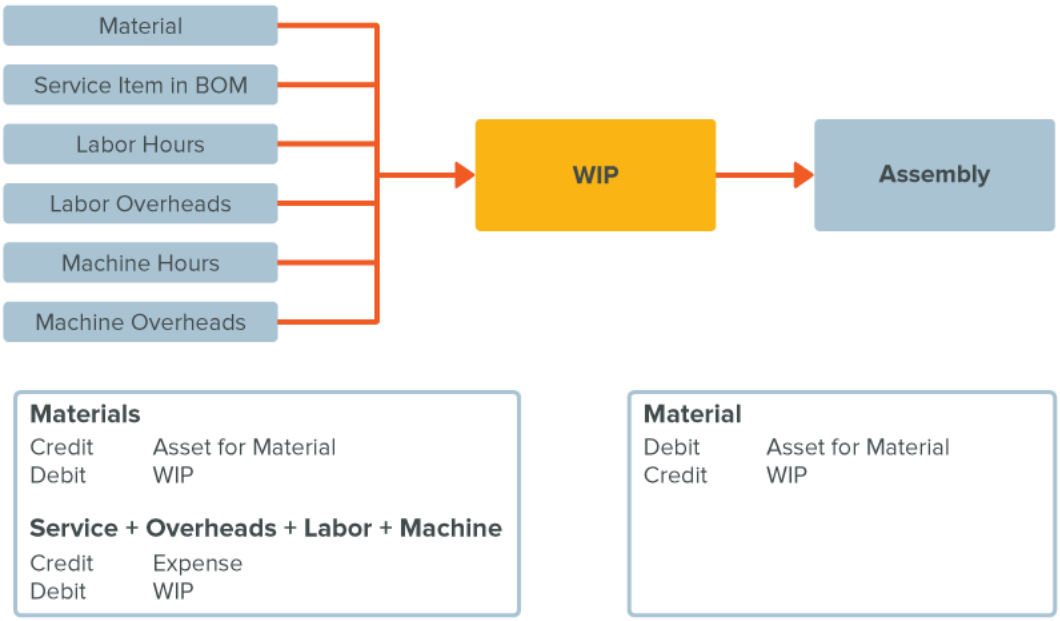
  To mark a work order closed go to Transactions > Manufacturing >Mark Work Orders Built..

  For more information, see Marking Work Orders Closed.

After you mark an order as built or closed, the operational task record associated with that order displays a task status displays as Completed.

Manufacturing Routing Costing

Values for assets and expenses associated with a routing work order post to the designated Work In Process (WIP) account during the assembly process.



Values are added to the WIP account based on time logged against operation tasks or quantity produced in a run. After the assembly process completes, the values are removed from the WIP account and added to the Asset for Assembly account.

Time Updates and Costing

When time is logged against an operation task for an assembly, NetSuite uses this time to calculate costs associated with the assembly. For example, when completion time is logged against an operation task, NetSuite generates the following accounting entries:

	Account	Formula
CR	Labor	Rate x Resources x Hours
DR	WIP account for assembly	Rate x Resources x Hours

- **Hours** - time logged on a completion record
- **Resources** - sourced from the completion record
- **Rate** - sourced from the operation task record

The result of these calculations posts to the WIP account for the assembly. Costs can be one of two types: setup costs or run costs.

Setup Costs

Costs need to be logged for expenses related to setting up for an assembly run. These costs are defined on the operation task record and are based on time logged against the task.

Note: Setup costs are only time dependent, not based on quantity produced.

For example, the operation task **Staging** defines costs on the Cost Detail subtab. One cost category defined is Labor Setup. Using this category on a task defines the following:

- The Labor Setup cost category record indicates the item **Other Charge for Purchase - Labor Setup**.
- The task record defines the fixed rate for using the item **Other Charge for Purchase - Labor Setup** at $30 .
- The item record for **Other Charge for Purchase - Labor Setup** indicates the **Assembly Staging Expense** expense account.

  Therefore, when you log time against the **Staging** task, the appropriate amount posts to the **Assembly Staging Expense** account. This amount is calculated as Expense amount = Setup time logged x Labor setup fixed rate.

  If 2 hours of time are logged against the **Staging** task, $60 is logged to the **Assembly Staging Expense** account.

Labor Setup	Account	
CR	Labor Setup	Rate x Resources x Hours
DR	WIP account for assembly	Rate x Resources x Hours

Similar calculations are made for other categories that may be defined on a task record. For example, overheads (Overhead expense amount = Setup time logged x overhead rate).

Labor Setup Overhead	Account	
CR	Labor Overhead Setup Account	Rate x Resources x Hours
DR	WIP account for assembly	Rate x Resources x Hours

Run Costs

Costs need to be logged for expenses related to processing an assembly run. These costs are defined on the operation task record and are based on quantity completed during the assembly run.

For example, the operation task **Staging** defines costs on the Cost Detail subtab. One cost category defined is Labor Run. Using this category on a task defines the following:

- The Labor Setup cost category record indicates the item **Other Charge for Purchase - Labor Run**.
- The task record defines the run rate for using the item **Other Charge for Purchase - Labor Run** at $65 .
- The item record for **Other Charge for Purchase - Labor Setup** indicates the **Assembly Staging Expense** account.

  Therefore, when you log time against the **Staging** task, the appropriate amount posts to the **Assembly Staging Expense** account. This amount is calculated as Expense amount = Setup time logged x Labor setup fixed rate.

  If 10 units are completed for the **Staging** task, $650 is logged to the **Assembly Staging Expense** expense account.

Labor Run	Account	
CR	Labor Run	Rate x Resources x Hours
DR	WIP account for assembly	Rate x Resources x Hours

Similar calculations are made for other categories that may be defined on a task record. For example, overheads (Overhead expense amount = Run quantity logged x overhead rate).

Labor Run Overhead	Account	
CR	Labor Overhead Run Account	Rate x Resources x Hours
DR	WIP account for assembly	Rate x Resources x Hours

Costing Lot Size

If you use Standard Costing and Manufacturing Routing and Work Center, the Costing Lot Size field appears on the assembly item record's Locations subtab. The default value for this field is 1, and the minimum value for this field is 0.01.

If you also use Multiple Units of measure, the value is in base units of measure.

During the cost rollup process, NetSuite calculates the routing cost of assemblies as follows:

Setup Cost	Run Cost
# of Resources x Setup Time x Manufacturing Charge Item Unit Cost / Standard Cost Lot Size (assembly item - item location map)	# of Resources (work center) x Run Rate (routing record) x Manufacturing Charge Item Unit Cost (item record)

Setup Cost	Run Cost
Resources are work centers. The Setup Time is from the routing record. Manufacturing Charge Item Unit Cost is from the item record.	

Outsourced Manufacturing

Outsourced Manufacturing helps customers manage their subcontracted manufacturing processes by purchasing outsourced assembly production from vendors. This feature enables NetSuite to automatically consume production components, and then after production, transfer them to a specified location. Automating Outsourced Manufacturing synchronizes NetSuite procurement and production transactions.

Outsourced Manufacturing automates the following features:

- Creating subcontracting orders for assemblies
- Managing ordering components for subcontracted production
- Simulating the manufacturing sub-contractor production
- Transferring half finished assemblies to other sub-contractors
- Drop-shipping the assembly to the customer, or shipping it to the brand-owner's warehouses

Setting up Outsourced Manufacturing

Before the Outsourced Manufacturing feature can be enabled, an administrator must enable prerequisite features, if they are not already enabled. After the prerequisite features are enabled, an administrator can then enable Outsource Manufacturing.

To enable Outsourced Manufacturing:

1. Go to Setup > Company > Enable Features (Administrator)
2. Ensure that the following features are enabled:
   - **Purchase Orders** - **Transactions** subtab, Basic Features section
   - **Advanced Receiving** - **Transactions** subtab, Shipping & Receiving section
   - **Multi-Location Inventory** - **Items & Inventory** subtab, Inventory section
   - **Assembly Items** - **Items & Inventory** subtab, Inventory section
   - **Advanced Bill of Materials** - **Items & Inventory** subtab, Inventory section
   - **Work Orders** - **Items & Inventory** subtab, Inventory section
3. Click **Save**.
4. Go back to Setup > Company > Enable Features (Administrator)
5. Click the **Items & Inventory** subtab.
6. In the **Inventory** section, check the **Outsourced Manufacturing** box.
7. Click **Save**.

Now you can define an outsourcing location for the vendor who will outsource manufacturing for you.

Configuring Outsourced Manufacturing

After Outsourced Manufacturing is enabled, you must define an outsourcing location for the vendor who will outsource manufacturing for you.

To define an outsourced manufacturing location:

1. Go to Lists > Relationships > Vendors.

   Important: You must have locations defined before you can configure your outsourced manufacturing location. For more information, see the help topic Creating Locations.

2. On the Vendors page, click **Edit** next to the vender who will outsource manufacturing for you.
3. Click the **Outsourced Manufacturing** subtab.
4. Beside the **Manufacturing Locations** field, click the arrow icon.
5. In the **Choose Manufacturing Location** list, select the location or locations, for the outsourcing vendor.

   Note: Each location can be used by one vendor, but a vendor can use multiple locations.

6. Click **Done**.
7. Click **Save**.

Configuring Outsourced Assembly Bins for Locations

If you are using bins, the outsourced assembly needs to have preferred bins set up for your locations.

To setup outsourced assembly for locations:

1. Go to Setup > Accounting > Accounting Preferences.
2. Click the Items/Transactions subtab.
3. Check the **Use Preferred Bin on Item Receipts** box.
4. Click **Save**.
5. Create a new **Locations** for each bin.

   To learn more, see Configuring Outsourced Manufacturing.
6. Create an **Outsourced Vendor**.

   Add your new locations to this vendor.
7. Create an **Outsourcing Charge Item**.

   To learn more, see the help topic Creating an Outsourced Manufacturing Item.
8. Create an **Inventory Item**.
   a. On the **Purchasing/Inventory** subtab, check the **Use Bins** box.
   b. Click **Save**.

   To learn more, see the help topic Creating Item Records.
9. Create an **Assembly Item**.
   a. On the **Purchasing/Inventory** subtab, check the **Use Bins** box.
   b. In the **Bin Numbers** section, select a **Location**.
   c. Add the new **Bin Number**.
   d. Clear the **Preferred (per Location)** box.
   e. Click **Save**.

   To learn more, see the help topic Assembly Items.
10. Create a **Bill of Materials (BOM)**.

    To learn more, see Create a BOM.

a. Assign the BOM to the assembly item.

   To learn more, see Linking a BOM to an Assembly.

11. To ensure a bin is available on the Item Receipt Component line, adjust inventory for the new inventory item.

    To learn more, see the help topic Entering an Inventory Adjustment.

Creating an Outsourced Manufacturing Item

Outsourced manufacturing items are the goods and services you sell to customers that have been produced in cooperation with your outsourcing vendor. You need to define the charge item used in the purchasing transaction.

To create an outsourcing charge item:

1. Go to Lists > Accounting > Items > New.
2. On the New Item page, click **Other Charge for Purchase** or **Service For Purchase**.
3. Enter a unique **Item Name/Number**.

   For example, Bike Production charge.
4. Complete the other fields in the page.
5. On the **Purchasing** subtab, enter a **Purchase Price**.
6. In the **Cost Category** field, select **Outsourcing Charge**.

   NetSuite recognizes this as an outsourcing charge item.

   > **Note:** When you select **Outsourcing Charge**, the **Can Be Fulfilled/Received** box on the **Preferences** subtab is checked and cannot be cleared.
7. In the Vendors section, select a **Vendor**.
8. To designate this vendor as your default vendor, check the **Preferred** box.
9. On the **Accounting** subtab, select a **Tax Schedule**.
10. Click **Save**.

After you create the outsourcing charge item, you must perform the following tasks:

- Create a **Bill of Materials (BOM)**. For example, Outsourced BOM. For more information, see Create a BOM.
- Create a **BOM Revision**. For more information, see the help topic Creating BOM Revisions.
  1. On the Bill of Materials Revision page, in the **Item** list, select the components you keep in inventory and will provide to the vendor. For example, bike seats and bicycle wheels.
  2. Select the **Outsourcing Charge** item.
  3. Enter the **BOM Quantity** per assembly. For example, 1 seat, 2 wheels, and 1 charge item.
  4. Click **Save**.
- Create an **Assembly Item**. For more information, see the help topic Creating Item Records.
  1. On the **Manufacturing** subtab, select the **Bill of Materials**.
  2. Optionally, click the **Master Default** box to designate this as your default BOM for this assembly.
  3. Click **Save**.

Outsourcing Production

NetSuite enables customers to outsource their manufacturing efforts to vendors. Customers can outsource from either a purchase order or from a work order.

To outsource production from a purchase order:

1. Go to Transactions > Purchases > Enter Purchase Order.
2. On the Purchase Order page, in the **Custom Form** field, select the **Standard Outsourced Purchase Order**.
3. Select the outsourcing **Vendor**.

   The Subsidiary field is populated.
4. Complete the remaining fields.

   For more information, see the help topic Entering a Purchase Order.
5. On the **Items** subtab, click **Items**.
6. From the **Assembly** list, select the outsource item.
7. Select the outsourcing **Location**.
8. In the **Item** field, select the item charge. For example, Bike Production Charge.
9. Enter the Item **Quantity**.

   NetSuite automatically completes the **Rate**, **Amount**, and **Production Dates** fields, but you can modify the values.
10. Select the **Bill of Materials**.
11. Select the **Bill of Materials Revision**.
12. Click **Add**.

    Continue to add lines based on what you are building in-house, and what you are outsourcing.
13. To automatically create work order, check the **Create WO** box.
14. Click **Save**.

    After you save the purchase order, a link to the new work order appears on the **Items** subtab.
15. Click the **Work Order** number link to display the work orders details.

    The **Outsourcing** subtab displays the following outsourcing information:
    - A checked outsourced box denotes that this order is outsourced
    - The vendor name
    - Outsourcing charge type
    - A link to the original purchase order
16. You can also click the **Create WO** link to let NetSuite automatically create a work order.
17. On Purchase Order page, click **Receive**.

    On the Item Receipt page, you can receive all the items, or some of the items.
18. On the **Items** subtab, in the **To Location** field, select where you want to receive the final product.

    Note: NetSuite automatically creates an Inventory Transfer and not a Transfer Order.
19. Click **Save**.

    NetSuite creates assembly build transactions for the received number of items.

Click an **Assembly Build** link to review assembly build details.

The Assembly Build Helper

NetSuite enables you to use the Outsourced Manufacturing feature with the Assembly Build Helper to override existing production data.

To change data using the Assembly Build Helper:

1. On the Purchase Order page, on the **Items** subtab, click the **Items** subtab.
2. Click the link in the **Assembly Build Helper** column.

   The Assembly Build Helper page displays the assembly items with editable fields. You can change the field values, as needed. For example, the vendor built 5 bicycle seats in production, therefore, twenty–seats were consumed. The **Quantity** field shows that twenty seats were consumed in the assembly build. You can change that number to twenty-five.
3. In the **Quantity** field, accept the default number, or enter a new number.

   If you use serial lot numbers for consumed or produced final production, you can edit these field values on the Assembly Build Helper page.

   When you override a purchase order rate for a line, NetSuite automatically uses the new rate in the final assembly charge.
4. Click **Save**.

Outsourcing Production from a Work Order

Customers who rely on supply planning, or are in a manufacturing environment usually create outsourced items from work orders.

To outsource production from a work order:

1. Go to Transactions > Manufacturing > Enter Work Orders.
2. Complete the required fields on the Work Order page, and other fields, as needed. For more information, see the help topic Entering an Individual Work Order.
3. On the **Items** subtab, select the item to be outsourced.
4. Select an outsourcing location.
5. Click the **Outsourcing** subtab.

   Depending on the outsourcing BOM, NetSuite checks the **Outsourced** box and completes the following selections:

   - Outsourced Vendor
   - Outsourcing Charge
   - Linked Purchase Order
6. Click **Save**.

Outsourced Manufacturing Consolidator

The Outsourced Manufacturing Consolidator lists all pending work orders.

Note: Before the Outsourced Manufacturing feature can be enabled, an administrator must enable prerequisite features. To learn more, see Setting up Outsourced Manufacturing.

To access the outsourced manufacturing consolidator:

1. Go to Setup > Manufacturing > Outsourced Manufacturing Management.

   This page enables you to learn work order specific information, such as:

   - Last Successful Run
   - Next Scheduled Run
   - Pending Work Orders
2. To update the work order information, click **Run Consolidator Now**.

SuiteAnalytics Manufacturing Workbook

SuiteAnalytics Workbook offers many workbook and dataset templates, each with predefined source data, criteria, pivot tables, and charts.

This chapter contains the information for the SuiteAnalytics Manufacturing workbook in NetSuite. For more information about SuiteAnalytics Workbook, see the help topic Workbook and Dataset Templates.

- Manufacturing Dataset
- Manufacturing Workbook
- Manufacturing Analytical Record Types

The SuiteAnalytics Workbook user interface enables customers with little record schema and query language knowledge to create complex workbooks using drag-and-drop editing. New customization options provide ways to display your data using rich formatting. For more information, see the help topic SuiteAnalytics Workbook Overview.

Manufacturing Dataset

This Manufacturing dataset combines fields from the Manufacturing Transaction record type and one custom formula. This dataset enables you to analyze the status of bills received during the last month. It forms the source data for the Manufacturing Workbook.

Dataset Configuration

The Manufacturing dataset combines fields from one record type, one custom formula, and multiple criteria filters. To edit the dataset, see the help topic Defining a Dataset.

Root Record Type	Joined Record Type	Custom Formula Field	Data Grid	Criteria Filers
Manufacturing Transaction	(none)	The following custom formula is included in the dataset: ■ **cost/unit** - CASE WHEN {quantity} > 0 THEN TO_NUMBER({transaction^ transaction.transactionlines. foreignAmount})/{quantity} END	The following fields are included in the dataset. Manufacturing Transaction: ■ Assembly ■ Date ■ End Date ■ Location ■ Memo ■ Posting Period ■ Quantity ■ Start Date ■ Transaction ■ Transaction Type	The following criteria is used to filer the dataset: ■ **Transaction Type** any of Assembly Build, Work Order Close ■ **Transaction Line: Main Line** is true ■ **Date** on or after 2 Years ago

Manufacturing Workbook

NetSuite provides a Manufacturing Transaction data source, which introduces the analytics transactions concept for manufacturing-specific transactions. The following transaction record types are available in the Manufacturing Transaction data source:

- Transaction/Manufacturing Transaction – Transaction Header information
- Transaction Line/Manufacturing Component – Standalone lines related to transaction

For more information, see Manufacturing Transaction and Creating a Manufacturing Workbook.

Manufacturing Transaction

Manufacturing Transaction is a modified transaction record that improves manufacturing data searches for the following manufacturing transactions:

- Work Order
- Assembly Build
- Assembly Unbuild
- Issue Components
- Work Order Completion
- Work Order Completion with Backflush
- Work Order Close

These searches are filtered so that specified transaction types return results faster than generic transaction searches. The data set is optimized for manufacturing by making the assembly field available in the manufacturing transaction.

When you join a manufacturing component transaction line, the results return only components as displayed on the form with positive quantities. Joining generic transaction lines can cause the main line to behave as a component. Providing results with negative quantities (consumed during the production).

If you need a field from the larger generic transaction data set, you can join it to a Manufacturing Transaction/Component. This join provides an expanded list of available fields.

Creating a Manufacturing Workbook

The following procedure provides details for creating a manufacturing workbook.

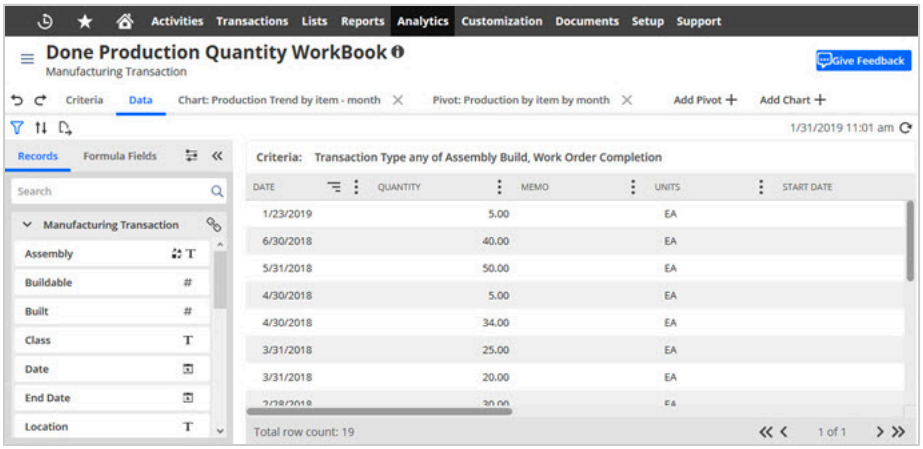
To create a manufacturing workbook:

1. Enable SuiteAnaytics Workbook.

   For more information, see the help topic Enabling SuiteAnalytics Workbook in Your NetSuite Account.
2. Select a workbook root record:
   a. Click the **Analytics** tab.
   b. Click **New Workbook**.
   c. In the **Search Record Types** field, enter **Manufacturing**.

d. Click the **Manufacturing Transaction [Beta]** record.

The Data tab opens with preselected fields on the Data Grid based on the manufacturing record.

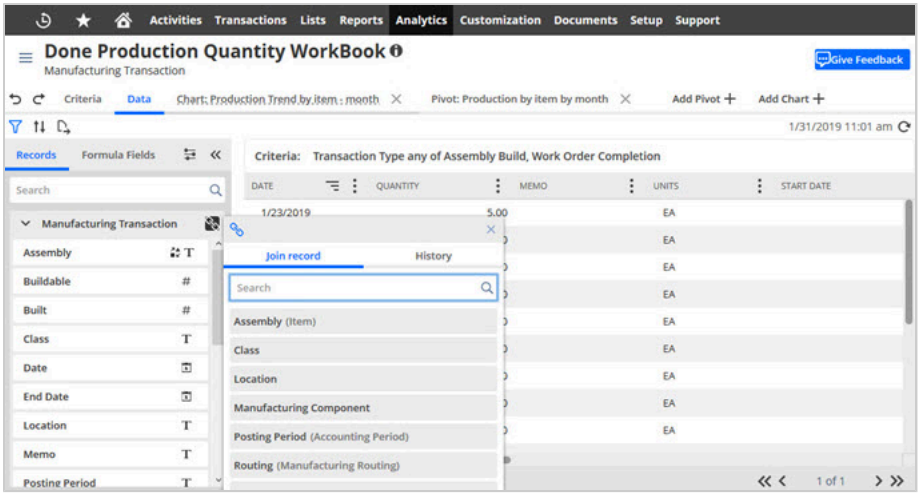


You can use only those fields that you add to the Data Grid to generate a pivot table or chart. By default, the Data Grid displays preselected fields, based on the root record selected for the workbook.

3. To select source data, use one of the following options to add fields from the Manufacturing Transaction record root to the data grid:

- From the Manufacturing Transaction record, drag a field to the Data Grid
- Double-click a field
- In the **Search** field, enter the field name and then drag or double-click the field

a. To add fields to the data grid from the Manufacturing Transaction related record, click the **Join Record** icon ().



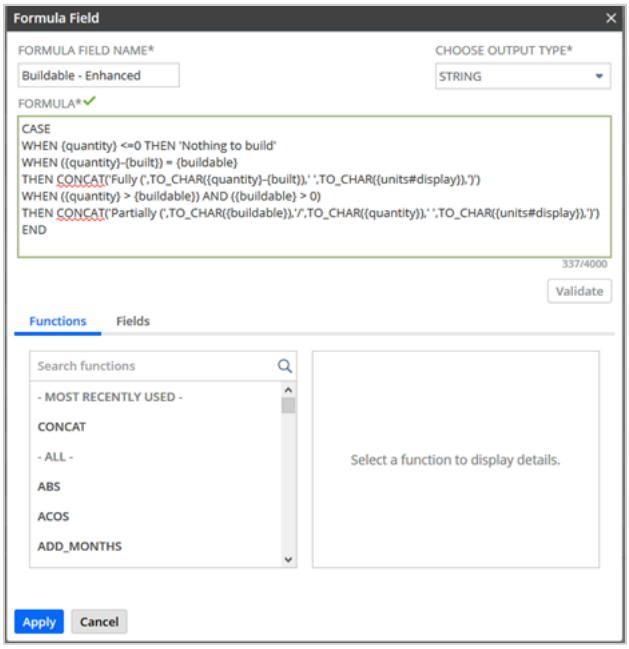
b. Select a **Join record**.

The **Fields** list updates to include the related record fields. Double–click or drag fields to the data grid.

4. To create formula fields, click the **Formula Fields** tab.

a. Enter the **Formula Field Name**.

For example, **Buildable – Enhanced**.



b. Select an **Output Type**.

   For example, **String**.

c. In the **Formula** field, enter the field IDs and SQL formula functions to use in the formula expression.

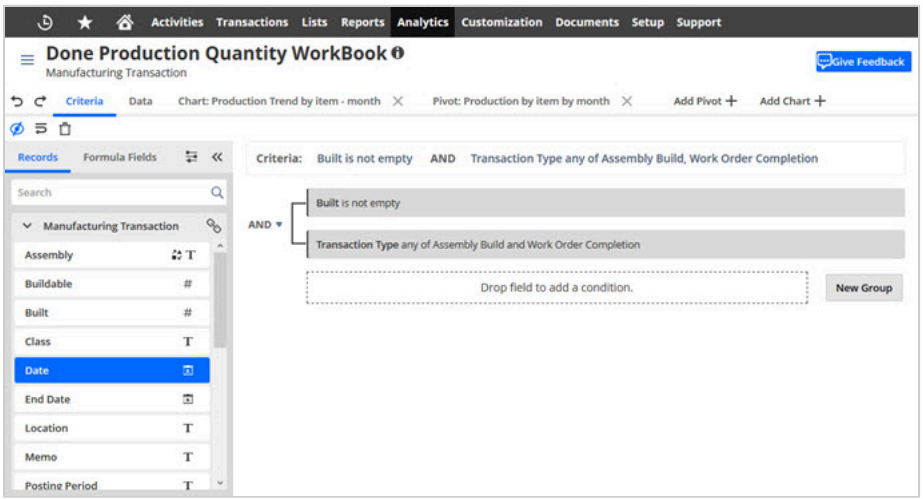
   Alternatively, in the **Functions and Fields** sections, double–click the field IDs or formula functions to add them to the expression.

d. Click **Validate**.

e. If there are no errors, click **Apply** to add the formula field to the workbook.

f. To filter the data source, click the **Criteria** tab.

g. Drag a record or formula field.



h. In the **Filter** window, select the filter conditions to apply to the field.

i. Repeat these steps for each filter you want to define.

By default, filters are added using an AND operator. To change the relationship between filters and filter groups, click the AND link and select OR from the popup window.

j. Click **OK**.

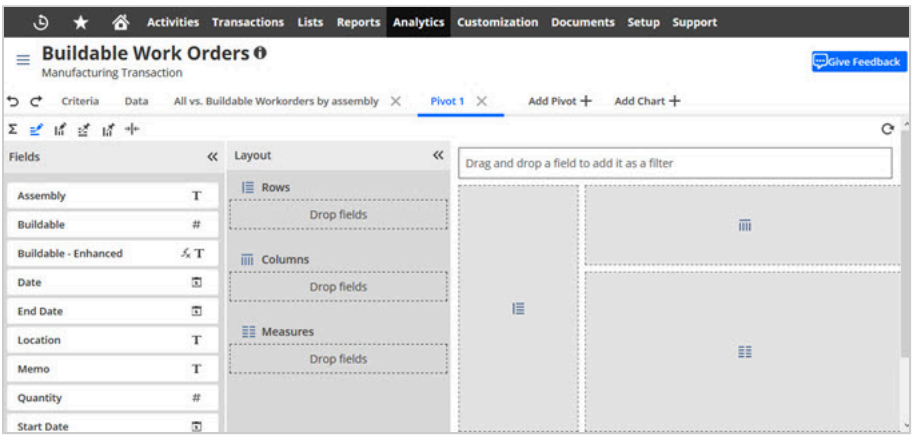
k. When you finish defining filters, click the **Data** tab.

The Data Grid displays only values that match your selected filter conditions, and a Criteria Summary appears above the grid.

5. To create a pivot table, click **Add Pivot**.

Drag fields into the **Rows**, **Columns**, or **Values** section in the **Layout** panel.

For example, the **Assembly** row, **Date (Year)** and **Date (Month)** columns, and **Quantity (Sum)** measure.



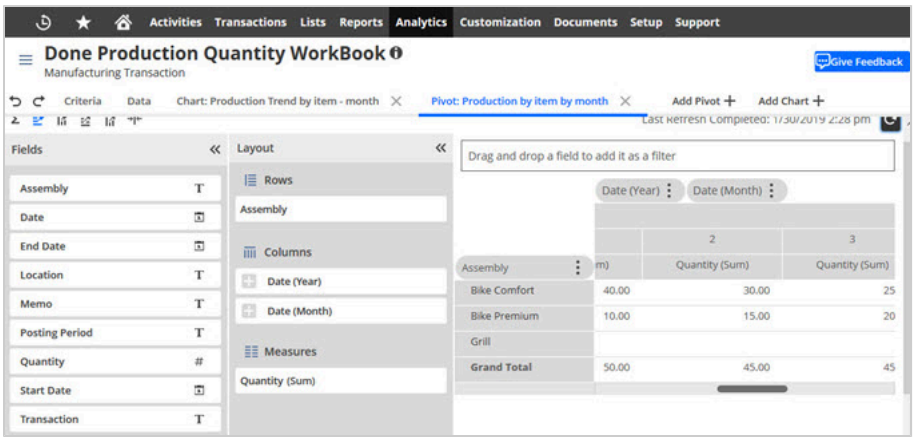
a. Select the summary type and format options for any date or numerical fields.

1. Beside the next to the field you want to format, click the **Field Menu** icon (⋮).
2. Select **Summary Types**.

b. Add totals and grand totals to the pivot table:

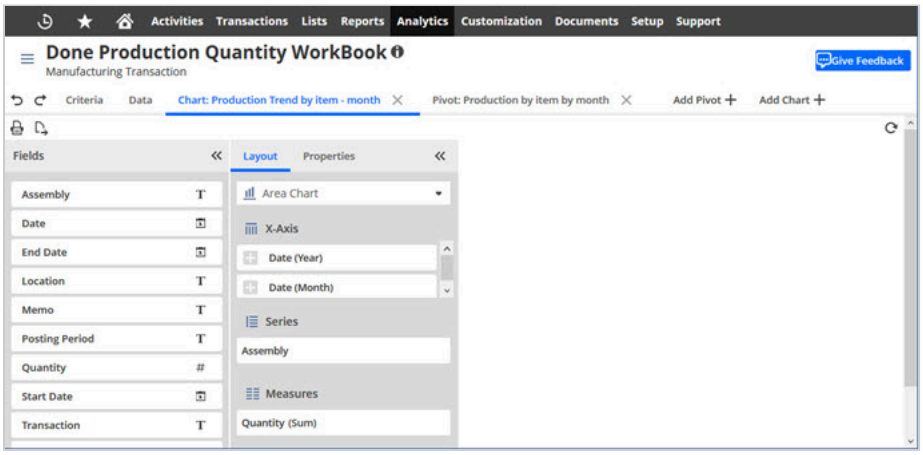
1. In the menu bar, click the totaling icon (Σ).
2. In the **Totaling** window, for each field, select where you want the totals or grand totals to appear.
3. Check the **Set Individually** box to select where the totals for each field will appear on the pivot table.
4. Click **OK**.

c. Click **Refresh** (↻) to generate the pivot table.



6. To create a chart, click **Add Chart**.
    a. Drag fields into the **X-Axis**, **Series**, or **Measure** section in the **Layout** panel.

       For example, create an **Area Chart**, with **Date (Year)** and **Date (Month)** on the **X-Axis**, for the **Assembly Series**, with **Quantity (Sum) Measures**.



    b. Select the summary type and format options for any date or numerical fields.
        1. Beside the next to the field you want to format, click the **Field Menu** icon (⋮).
        2. Select **Summary Types**.
    c. In the **Layout** panel select a chart type.
    d. Click **Refresh** (↻) to generate the chart.
    e. In the Workbook Menu (⋮), click **Save As**.
    f. In the **Save Workbook As** window, enter a name and description for the workbook.
    g. Click **Apply**.

Manufacturing Analytical Record Types

The Manufacturing workbook offers two analytical record types:

- Manufacturing Transaction Analytical Record Type
- Manufacturing Component Analytical Record Type

Manufacturing Transaction Analytical Record Type

The manufacturing transaction analytical record type combines fields from the transaction and transaction line record types. This record type includes data for transactions that meet the following criteria:

```
Transaction type is one of WorkOrd, Build, Unbuild, WOCompl, WOIssue, WOClose
AND
Transaction line ID is 0
```

This record type is the root record type on the Manufacturing Dataset. To access the record type or the dataset, you must have the Assembly Items feature enabled. Some fields in the record type are also feature dependent, or display values based on custom formula definitions.

For more information about the fields included in the manufacturing transaction analytical record type, see the following table:

Field	Source Record Type	Source Field	Custom formula or feature dependency
Actual Production Start Date	Transaction	Date	N/A
Actual Production End Date	Transaction	Date	N/A
Assembly	Transaction Line	Item	N/A
Bill of Materials	Transaction	Bill of Materials	Displayed only with the Advanced BOM feature enabled
Bill of Materials Revision	Transaction	Bill of Materials Revision	Displayed only with the Advanced BOM feature enabled
Buildable	Transaction Line	Buildable	Displayed only with the Work Orders feature enabled

Built	Transaction Line	Quantity Shipped/Received/ Picked Up	`CASE WHEN TransactionLINE.QUANTITY IS NULL`
			`THEN NULL ELSE`
			`TransactionLine.QUANTITY_SHIP_RECV`

Class	Transaction Line	Class	Displayed only with the Classes feature enabled
Date	Transaction	Date	N/A
Department	Transaction Line	Department	Displayed only with the Departments feature enabled
End Date	Transaction	End Date	Displayed only with the Manufacturing Routing and Work Center, Demand Planning, or MRP features enabled.
Location	Transaction Line	Location	Displayed only with the Locations feature enabled
Memo	Transaction	Memo	N/A
Posting Period	Transaction	Posting Period	Displayed only with the Accounting Periods feature enabled

Field	Source Record Type	Source Field	Custom formula or feature dependency
			Note: This field displays no values for work orders.
Quantity	Transaction Line	Quantity	N/A
Reference	Transaction	Document Number	N/A
Routing	Transaction	Manufacturing Routing	Displayed only with the Manufacturing Routing and Work Center feature enabled
Start Date	Transaction	Start Date	Displayed only with the Manufacturing Routing and Work Center OR Demand Planning or MRP features enabled.
Subsidiary	Transaction Line	Subsidiary	Displayed only with NetSuite OneWorld where subsidiaries are defined
Transaction	Transaction	Internal ID	**Note:** This field displays the Transaction Display Name instead of the internal field ID.
Transaction Type	Transaction	Type	N/A
Units	Transaction Line	Units	Displayed only with the Multiple Units of Measure feature enabled
WIP	Transaction	WIP	Displayed only with the Manufacturing Work In Process feature enabled

Manufacturing Component Analytical Record Type

The manufacturing component analytical record type combines fields from the transaction, transaction line, and transaction accounting line record types. This record type includes data for transactions that meet the following criteria:

```
Transaction type is one of WorkOrd, Build, Unbuild, WOCompl, WOIssue, WOClose
```

The manufacturing component analytical record type is included in the field list on the Manufacturing Dataset. To access the record type, you must have the Assembly Items feature enabled. Some fields in the record type are also feature dependent, or display values based on custom formula definitions.

For more information about the fields included in the manufacturing component analytical record type, see the following table:

Field	Source Record Type	Source Field	Custom formula or feature dependency
Build Variance	Transaction Line	Build Variance	Displayed only with Work Orders feature enabled
Item	Transaction Line	Item	N/A
Line Number	Transaction Line	Line Number	N/A
Quantity	Transaction Line	Quantity	`abs(Quantity)//always positive`

Field	Source Record Type	Source Field	Custom formula or feature dependency
Quantity Available	N/A - calculated	N/A - Calculated	"CASE transaction." + TransactionTypeFragment.FieldId.TYPE + " WHEN 'WorkOrd' " + THEN get_item_avail(componentLine." + TransactionLineCommonFragment.FieldId.ITEM + ", componentLine." + LocationSelectFragment.FieldId.LOCATION + ") " + "ELSE NULL END"
Quantity Back Ordered	Transaction Line	Back Ordered	N/A
Quantity On Hand	N/A - calculated	N/A - calculated	"CASE WHEN transaction." + TransactionTypeFragment.FieldId.TYPE + " IN ('WorkOrd', 'Unbuild') " + "THEN get_invtitem_onhand(componentLine." + TransactionLineCommonFragment. FieldId.ITEM + ", nvl(componentLine." + LocationSelectFragment.FieldId.LOCATION + ", –1)) " + "ELSE NULL END"
Quantity Used In Build	Transaction line	Quantity Shipped/ Received/Picked Up OR Quantity	"CASE WHEN transaction." + TransactionTypeFragment.FieldId.TYPE + " = 'WorkOrd' " + "THEN "+ "-sign(nvl(nullif(componentLine." + TransactionLineQuantityFragment.FieldId.QUANTITY + ", 0), –1))" + " * " + "decode(" + "componentLine." + TransactionLineCommonFragment.FieldId. ITEM_TYPE + ", 'Group',NULL, " + "nvl2(" + "accountingLine." + TransactionAccountingLineAccount Fragment.FieldId.ACCOUNT + ", " + "decode(" +"componentLine." + TransactionLineQuantityFragment.FieldId.QUANTITY + ", NULL ", " + "componentLine." + TransactionLine.FieldId.QUANTITY_SHIP_ RECV + ")" + ", NULL)) " + "ELSE NULL END"
Units	Transaction Line	Units	Displayed only with Multiple Unit of Measure feature enabled

Engineering Change Order

The Engineering Change Order feature is part of the Supply Chain Management SuiteApp V4.0. For more information, see the help topic Installing the Supply Chain Management SuiteApp.

The Engineering Change Order feature lets you generate engineering change order (ECO) records. These records document changes to your Bills of Materials (BOMs) and authorize the implementation of those changes.

- Using the ECO record, you can list item and bill of materials to be updated, and specify reasons for the change.
- Through the SuiteApprovals workflow, you create approval rules for your ECO records.
- Each ECO record is evaluated and routed for approval through the applicable approval rule.
- After approval, changes entered on the ECO record are automatically or manually implemented, and affected records are modified.
- You can keep track of revisions to items and BOMs using ECO lists and implementation logs.

Refer to the following concepts before enabling Engineering Change Order:

- **Advanced Bill of Materials** - List the quantities of raw materials, assemblies, sub-components, and parts needed to manufacture a product at one or multiple facilities. After your administrator enables the Advanced Bill of Materials feature, the Advanced BOM replaces the Assembly/Bill of Materials record. For more information, see Advanced Bill of Materials.
- **Approval Routing** - When you use approval routing, transactions that are entered are not processed until they are approved. This gives provides oversight to persons of authority who can reject some transactions if they do not wan them to continue being processed. For more information, see the help topic Approval Routing.

Availability

The Engineering Change Order feature is available in the Supply Chain Management SuiteApp. For information about this SuiteApp, see the Availability section of Supply Chain Management Reports. You may also contact your NetSuite account manager.

Limitations

- Engineering Change Order supports Inventory and Assembly Items only.
- Use of the feature requires Advanced Bill of Materials.
- Custom workflows for ECO approval are not currently supported.
- A User Event (UE) script execution threshold is associated with successful loading of ECO records. ECO records are successfully loaded when the account has no more than 80,000–90,000 active assembly and inventory items per subsidiary.
- Support for SOAP web services and CSV import is currently not available with the feature.
- The feature does not support Legacy BOM. For more information, see Enabling Advanced BOM.

Setup Requirements for Engineering Change Order

Complete instructions or perform procedures in the following setup topics:

Prerequisite for Engineering Change Order

An administrator must enable the Advanced Bill of Materials feature at Setup > Company > Setup Tasks > Enable Features (Administrator). On the **Items & Inventory** subtab, check the **Advanced Bill of Materials** box and then save. For more information, see the help topic Enabling Features.

Installing the Supply Chain Management SuiteApp

Install the Supply Chain Management SuiteApp with the following details:

- Bundle Name - **Supply Chain Management**
- Bundle ID - **47193**

For instructions, see the help topic Installing Supply Chain Management.

For information on installing bundles, see the help topic Installing a Bundle.

Set Up the SuiteApprovals SuiteApp for Engineering Change Order

SuiteApprovals provides the workflow for ECO approvals.

You must perform this setup **before** Enabling Engineering Change Order.

Important: Custom workflows for ECO approvals are not currently supported.

Installation

For instructions, see the help topic Installing the SuiteApprovals SuiteApp.

Deploying the Required Script

After the SuiteApprovals SuiteApp is installed, deploy the required script to the Engineering Change Order record.

To deploy the required script for engineering change order:

1. Go to Customization > Scripting > Scripts.
2. Search for **SAS Supported Records UE** in the list.
3. Click the **View** link for the script.
4. Click **Deploy Script**.
5. In the **Applies To** field, select **Engineering Change Order**.

6. In the **ID** field, enter a unique ID for the deployment.
7. In the **Execute as Role** field, select **Administrator**.
8. Under **Audience** subtab, check the **Select All** box for Roles.
9. Click **Save**.

Enabling Engineering Change Order

After the Supply Chain Management SuiteApp is installed, you must enable the Engineering Change Order feature.

Important: Access to the Supply Chain Preferences page is supported only for users with Administrator roles.

To enable Engineering Change Order:

1. Go to Transactions > Management > Supply Chain Management.
2. On the Supply Chain Management page, click the **Preferences** link.
3. On the Supply Chain Preferences page, click **Edit**.
4. On the **Features** subtab, check the **Engineering Change Order** box.
5. Click **Save**.

After the feature is enabled, set up the role records of those who will use engineering change order. For more information, see Roles and Permissions for Engineering Change Order.

Roles and Permissions for Engineering Change Order

By default, the prebuilt custom forms and records for Engineering Change Order are enabled for the following roles:

- Accountant (View)
- CEO
- CFO
- Warehouse Manager
- Administrator

Note: Administrator role is not available for selection in approval matrices. For more information, see Setting Up SuiteApprovals Workflow for Engineering Change Order.

Other roles need additional permissions to use the feature. The table below outlines the permissions required for using Engineering Change Order and SuiteApprovals. For information about customizing roles, see the help topic Customizing or Creating NetSuite Roles.

Permission	Level
To allow a custom role to set up approval rules:	
Approval Rule record	Full
Approval Matrix record	Full
To allow a custom role to set up approval information and delegation:	

Permission	Level
Lists > Employees	Edit
To allow a custom role to set up roles, departments, or groups:	
Setup > Bulk Manage Roles	Full
Lists > Departments	Full
Lists > CRM Groups	Full
To allow a custom role to set up Department Approvers:	
Department Approver record	Full
Lists > Custom Record Entries	Full
Lists > Departments	Full
Lists > Subsidiaries	Full
Lists > Employees	Full
To allow a role to create engineering change order types:	
Engineering Change Order Type	Full
To allow a role to create, view, or edit engineering change orders:	
Engineering Change Order Type	View
Engineering Change Order	Full
Custom Record Entries	View
To allow a role to access ECO implementation status:	
ECO Implementation Log record	View

After you customize a role to access SuiteApprovals and Engineering Change Order lists and records, an administrator must add the role to script deployments.

Adding Approval Rule Access to Custom Roles

Use the following procedures to add approval rule access to custom roles.

To add access to approval rule records for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **SAS Approval Rule SU**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Approval Rule records.

   You can select multiple roles by holding down the Ctrl key when selecting each role.

   Note: Ensure that the **Execute as Role** field is set to Administrator.
4. When you finish, click **Save**.

To add access to the approval rule list for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **SAS Approval Rule List SU**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Approval Rule list records.

   You can select multiple roles by holding down the Ctrl key when selecting each role.

   Note: Ensure that the **Execute as Role** field is set to Administrator.
4. Optionally, under the **Links** subtab, add a menu link for the center of the custom role.
5. When you finish, click **Save**.

To add access to the approval rule assistant for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **SAS Approval Rule Assistant**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Approval Rule Assistant records.

   You can select multiple roles by holding down the Ctrl key when selecting each role.
4. When you finish, click **Save**.

To add access to approval delegation for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **SAS Approval Delegation SU**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Approval Delegation records.

   You can select multiple roles by holding down the Ctrl key when selecting each role.
4. When you finish, click **Save**.

To use SuiteApprovals, you must also set up the following requirements for users and approvers:

- Assign the Employee Center role to approvers.
- Keep email addresses up to date to be sure that users and approvers receive the notifications.

For more information about assigning roles, see the help topic Assigning Roles to an Employee.

To add access to Implement Engineering Change Order records for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **ECO Implement SU**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Implement Engineering Change Order record.

   You can select multiple roles by holding down the Ctrl key when selecting each role.
4. When you finish, click **Save**.

To add access to ECO Implementation Status for a custom role:

1. Go to Customization > Scripting > Script Deployments.
2. Click **Edit** next to **ECO Implement Log SU**.
3. On the **Audience** subtab, in the **Roles** field, select the roles you want to have access to Implement Engineering Change Order record.

You can select multiple roles by holding down the Ctrl key when selecting each role.

4. When you finish, click **Save**.

Setting Engineering Change Order Preference

You can manually implement approved engineering change orders, or allow the system to do it automatically using a preference.

To enable the engineering change order preference:

1. Go to Transactions > Management > Supply Chain Management.
2. On the Supply Chain Management page, click the **Preferences** link.
3. On the Supply Chain Preferences page, click **Edit**.
4. On the **Engineering** subtab, check the **Implement Engineering Change Order Upon Final Approval** box.
5. Click **Save**.

Note: If you do not want to use the preference, refer to the instructions in Implementing Engineering Change Orders.

Setting Up Engineering Change Order Types

With Engineering Change Order, you can support change management processes across your organization. An issue may involve a product change, component update, document revision, or modifications to work instructions. You can record these issues so that the change details they define can be approved and implemented.

Before you set up engineering change order types, identify the departments and business processes that would require control of change activities.

There is no limit to the number of change types you can create. The only requirement is that each type is unique.

Important: Engineering Change Order supports the following actions in an ECO regardless of ECO type: **Add**, **Replace**, and **Remove**.

To set up an engineering change order type:

1. Go to Lists > Engineering > Engineering Change Order Type > New (Administrator).
2. On the Engineering Change Order Type page:
    a. In the **Code** field, optionally enter a unique code for the ECO type. If you enter a code, the code will prefix the name of the ECO type.
    b. In the **ECO Type** field, enter a unique name for the ECO type.
    c. Optionally, enter additional information about the ECO Type in the **Description** field.
3. When you have finished, click **Save**.

Alternately, you can open the Engineering Change Order Type page by clicking **New Engineering Change Order Type**. This button is located on the Engineering Change Order Type List page at Lists > Engineering > Engineering Change Order Type.

To edit an engineering change order type:

1. Go to Lists > Engineering > Engineering Change Order Type (Administrator).
2. Click the **Edit** link for the ECO Type you want to update.
3. On the Engineering Change Order Type page:
   - Enter the changes you want to make and then proceed to Step 4.
   - Check the **Inactive** box if you want this record not to show up on lists.
   - To remove the ECO Type record, click **Delete** under **Actions**.
4. When you finish, click **Save**.

Setting Up SuiteApprovals Workflow for Engineering Change Order

Before you set up the SuiteApprovals workflow, consider your current change management processes as they relate to ECO approvals across your organization. For each change type you define, you can create distinct approval rules in terms of criteria and approvers list.

- You define the criteria of a rule based on your change management process, the ECO Types you created, and approval schedules.
- You then create an approval list composed of employees required to act on ECO records defined by the criteria.

The following procedures must be completed to set up the SuiteApprovals workflow for engineering change order:

- Assign a Supervisor to an Employee
- Setting Up Department Approvers for Engineering Change Order
- Set Up Group Approvers for Engineering Change Order
- Set Up Role Approvers for Engineering Change Order
- Setting Up Approval Delegation for Engineering Change Order
- Approval Rules for Engineering Change Order

Assign a Supervisor to an Employee

If supervisor approvals are required in your approval rules for engineering change orders, note the following. Every employee who uses Engineering Change Order has a supervisor set up in their employee record. For more information, see the help topic Assigning a Supervisor to an Employee.

Setting Up Department Approvers for Engineering Change Order

Important: Only administrators or roles with custom permissions can set up Department Approver records. For more information, see Roles and Permissions for Engineering Change Order.

When you create an approval rule, you can require approval from an employee who is authorized to approve ECOs for a department. To select an employee as department approver, you must first set up a

record for that employee. You can set up only one department approver per department, or combination of department and subsidiary.

To set up a department approver for engineering change orders:

1. Go to Setup > Workflow Manager > Set Up Department Approver > New.
2. Select a department and a subsidiary. For NetSuite OneWorld, the combination of department and subsidiary must be unique.
3. In the **Approver** field, select the employee you want to assign as department approver.
4. When you finish, click **Save** or **Save & New** to create another record.

Important: Setting up of department approver records through SOAP web services or CSV import is not currently supported.

To edit a department approver record:

1. Go to Setup > Workflow Manager > Set Up Department Approver.
2. Click **Edit** next to the record you want to edit.
3. Select new values on the Department Approver page. Check the **Inactive** box if you do not want this approver to be available for selection as department approver in any approval rule.

   Under **Actions**, select **Delete** and click **OK** in the confirmation message to remove the record.
4. When you finish, click **Save**.

Set Up Group Approvers for Engineering Change Order

Important: Only administrators or roles with custom permissions can set up Department Approver records. For more information, see Roles and Permissions for Engineering Change Order.

When you create an approval rule for ECOs, you can require approval from one or all members of a specific group of employees. To add approvers of the types **Group (Any)** and **Group (All)** to an approval list, you must first set up group records. For steps to create group records, see the help topic Working with Groups.

Ensure that employee records of group members are active to avoid errors when adding these approver types in approval lists.

Note: Inactive employees, employees from different subsidiaries, or those without login access are considered invalid members. These employees will not be added as approvers when the group they belong to is selected as group approver.

Note: You do not need to create groups based on roles. For more information, see Set Up Role Approvers for Engineering Change Order.

Set Up Role Approvers for Engineering Change Order

When you create an approval rule, you can require approval of ECOs from one or all employees with a specific role. You can add approvers with standard and custom roles by selecting the approver types **Role (Any)** and **Role (All)** in the approval matrix. For more information, see the help topic Assigning Roles to an Employee.

Ensure that role records are active to avoid errors when adding these approver types in approval rules.

Note: Only active employees in the same subsidiary of the approval rule will be added as approver for any of the Role approver types.

Setting Up Approval Delegation for Engineering Change Order

You can delegate your approval of ECO records indefinitely or for a period of time, specified by start and end dates. When you delegate your approval, ECO records requiring your approval are routed to your delegate.

Note: You can only delegate approval to another employee within your subsidiary.

To delegate approval:

1. Got to Lists > Employees > Employees.
2. Click **Edit** next to your name in the employees list.
3. Click the **Human Resources** subtab.
4. Click the **Approval Delegation** subtab.
5. Check the **Delegate Approval** box.
6. In the **Delegate To** field, select the employee you want to delegate your approval to.
7. Select start and end dates. Do not select a date range if you want to delegate indefinitely.
8. When you finish, click **Save**.

You can return to your record anytime to change your approval delegation details.

To delegate approval using your Employee Center role:

1. Log in to NetSuite using your Employee Center role.
2. Under **My Information**, click **Approval Delegation**.
3. In the **Delegate To** field, select the employee you want to delegate your approval to.
4. Select start and end dates. Do not select a date range if you want to delegate indefinitely.
5. When you finish, click **Save**.

Approval Rules for Engineering Change Order

Important: Ensure that you have set up ECO types before creating approval rules for engineering change orders. See Setting Up Engineering Change Order Types.

You can create approval rules using the Approval Rule page or the Approval Rule Assistant.

Guidelines for Creating Approval Rules

- The combination of Subsidiary (NetSuite OneWorld), Priority, Record Name, and Saved Search (if any) must be unique.

- If you want to use a saved search in an approval rule, create saved searches of ECO records before you create approval rules. For more information, see the help topic Saved Searches.
- By default, an approval rule locks ECO records that are in Approved or Pending Approval status. An ECO record may be edited and resubmitted for approval only if its status is set to Rejected. For more information, see Resubmitting Engineering Change Orders for Approval.

Approval Rules Workflow on Engineering Change Order Records

1. The system checks the record name, and then the subsidiary (if any).
2. The system checks for running approval rules. If there are multiple, the rules are evaluated by priority. The one with the highest priority is activated.
3. The rule checks if the ECO record passes any saved search criteria.
   - If the rule matches, then the workflow proceeds.
   - If the rule does not match, the system runs the rule with the next highest priority.
   - If no rule is found, the record exits the approval workflow. Approve the ECO record manually.

Creating an Approval Rule Using the Approval Rule Page

Use the following procedure to create an approval rule from the Approval Rule page.

To create an approval rule using the Approval Rule page:

1. Go to Setup > Workflow Manager > Approval Rule List.
2. On the Approval Rule List page, click **New Approval Rule**.
3. In the New Approval Rule popup window, click **Use the New Approval Rule page**.
4. On the Approval Rule page:

   Under **Primary Information**:

   - In the **Name** field, enter a unique name for the rule.
   - Enter additional information about the rule in the **Description** field.
   - Select **Engineering Change Order** in the **Record Name** field.
   - Select start and end dates for this approval rule.

     An approval rule becomes active on the date it starts. The start date can be before the current date, today's date, or a future date. After an approval rule starts, its status is set to Running.

     The end date can be the same as the start date or a future date, but not earlier than the start date.
   - Select a subsidiary.

     This is mandatory for NetSuite OneWorld.
   - To use a saved search in the rule, select it in the **Saved Search Condition** field.

     If you use a saved search, the approval workflow filters ECO records for approval based on the saved search criteria. For more information, see the help topic Saved Searches.
   - Enter the approval rule's priority in the **Priority** field. Use an integer. The highest priority is always 1.

   Under **Approval Routing**:

Note: Engineering Change order does not use amount validation. The amount validation fields are disabled on the approval rule record.

By default, approval routing is set to custom approval. Build your approval hierarchy using the matrix. You can add approvers of the following types:

- **Employee Supervisor** - The direct supervisor of the employee who submits the ECO record. See Assign a Supervisor to an Employee.
- **Specific Approver** - Any employee that belongs to the same subsidiary as the approval rule.
- **Department Approver** - You can only select an employee as department approver if a record is already set up for that employee. For more information, see Setting Up Department Approvers for Engineering Change Order.
- **Group (Any)** - Select a group to require that at least one of its members takes action on the ECO record. See Set Up Group Approvers for Engineering Change Order.
- **Group (All)** - Select a group to require that all its members take action on the ECO record.
- **Role (Any)** - Select a role to require that at least one employee with the role takes action on the ECO record. See Set Up Role Approvers for Engineering Change Order.
- **Role (All)** - Select a role to require that all employees with the role take action on the ECO record.

Important: When adding approvers, consider the sequence by which you add each one. Make sure the hierarchy you build meets your approval process and requirements.

- The employee's supervisor is the first approver, by default. Click the **Delete** icon to remove the supervisor from the approval chain, or to add back in another place in the sequence.
- Click **Add Approver**, and select the **Approver Type** and **Approver**. Repeat these instructions to add more approvers.
- Ensure that you add all the required approvers, and that the sequence is correct.

Note: The maximum number of approvers you can add is twenty.

5. When you finish, click **Save**.

Creating an Approval Rule Using the Approval Rule Assistant

Use the following procedure to create an approval rule using the Approval Rule Assistant.

To create an approval rule using the Approval Rule Assistant:

1. Go to Setup > Workflow Manager > Approval Rule List.
2. On the Approval Rule List page, click **New Approval Rule**.
3. In the New Approval Rule window, click **Use the Approval Rule Assistant**.
4. Under **Step 1 Enter Basic Information**:
   - In the **Name** field, enter a unique name for the rule.
   - In the **Record Name** field, select **Engineering Change Order**.
   - Select a subsidiary.

     This is mandatory for NetSuite OneWorld.
   - Enter additional information about the rule in the **Description** field.

- Select start and end dates for this approval rule.

  An approval rule becomes active on the date it starts. The start date can be before the current date, today's date, or a future date. After an approval rule starts, its status is set to Running.

  The end date can be the same as the start date or a future date, but not earlier than the start date.
- To use a saved search in the approval rule, select it in the **Saved Search Condition** field.
- Enter the approval rule's priority in the **Priority** field. Use an integer. The highest priority is always 1.

When you finish, click **Next**.

5. Under **Step 2 Define Approval Routing**:

   Note: Engineering Change order does not use amount validation. The amount validation fields are disabled on the approval rule record.

   By default, approval routing is set to custom approval. Build your approval hierarchy using the matrix.

   You can add approvers of the following types:

   - **Employee Supervisor** - The direct supervisor of the employee who submits the ECO record. See Assign a Supervisor to an Employee.
   - **Specific Approver** - Any employee that belongs to the same subsidiary as the approval rule.
   - **Department Approver** - You can only select an employee as department approver if a record is already set up for that employee. For more information, see Setting Up Department Approvers for Engineering Change Order.
   - **Group (Any)** - Select a group to require that at least one of its members takes action on the ECO record. See Set Up Group Approvers for Engineering Change Order.
   - **Group (All)** - Select a group to require that all its members take action on the ECO record.
   - **Role (Any)** - Select a role to require that at least one employee with the role takes action on the ECO record. See Set Up Role Approvers for Engineering Change Order.
   - **Role (All)** - Select a role to require that all employees with the role take action on the ECO record.

   Important: When adding approvers, consider the sequence by which you add each one. Ensure the hierarchy you build meets your approval process and requirements.

   - The employee's supervisor is the first approver, by default. Click the **Delete** icon to remove the supervisor from the approval chain, or to add back in another place in the sequence.
   - Click **Add Approver**, and select the **Approver Type** and **Approver**. Repeat these instructions to add more approvers.
   - Ensure that you add all the required approvers, and that the sequence is correct.

   Note: The maximum number of approvers you can add is twenty.

   When you finish, click **Next**.

6. Under **Step 3 Review Approval Rule**, review the details of your approval rule. Go back to the previous pages to make changes, as needed.

   Click **Finish** to create the approval rule.

You can copy, edit, or set an approval rule to **Inactive**.

Copying an Approval Rule

Use the following procedure to copy an approval rule.

To copy an approval rule:

1. Go to Setup > Workflow Manager > Approval Rule List.
2. Click **View** next to the approval rule record you want to copy.
3. Click **Make Copy**.
4. In the **Name** field, enter a unique name for the rule.
5. By default, the start date is the current date. Select another date from the calendar, as needed.
6. Select an end date.
7. Select a subsidiary, if other than the copied value.
8. Optionally, select a saved search.
9. Enter the approval rule's priority in the **Priority** field. Use an integer. The highest priority is always 1.
10. When you finish, click **Save**.

Important: You can make extensive changes to an approval rule only if it is not currently running. If it is running, you can update only the rule's end date. The system validates the updated rule for uniqueness.

Editing an Approval Rule

To edit an approval rule:

1. Go to Setup > Workflow Manager > Approval Rule List.
2. Click **Edit** next to the approval rule record you want to edit.
3. Make the changes to the approval rule.

   Check the **Inactive** box if you do not want the rule to run against any ECO records for approval.

   Click **Delete** to remove the approval rule record.
4. When you finish, click **Save**.

Important: You cannot delete an approval matrix if there is an ECO record in Pending Approval that is using the approval matrix.

Using Engineering Change Order

See the following help topics about how to use an engineering change order.

- Creating Engineering Change Orders
- Approving or Rejecting Engineering Change Orders
- Resubmitting Engineering Change Orders for Approval
- Implementing Engineering Change Orders
- Viewing Implementation Status
- Viewing Approval History

Creating Engineering Change Orders

Create an engineering change order to list changes in an assembly item's bill of materials. You can also use the ECO record to enter process changes for documentation. When created, NetSuite validates the ECO record for uniqueness and enters the SuiteApprovals workflow.

To review how approval rules work, see Approval Rules for Engineering Change Order.

Guidelines for Creating Engineering Change Orders

The feature supports bulk processing of ECO records:

- Multiple **Add** actions for one or more items in one ECO record.
- Multiple **Remove** actions for one or more items in one ECO record.
- Multiple **Replace** actions for one or more items in one ECO record.
- A mix of **Add**, **Remove**, and **Replace** actions for one or more items in one ECO record.
- **Add**, **Remove**, and **Replace** actions for the same BOM and BOM revision are processed together.

NetSuite sends an email notification to coordinators of ECOs when bulk processes complete. The email body contains a link to the ECO record and error details, if any occurred during implementation.

Note: During manual or automatic implementation, you can view the Implementation Status of any ECO and track the status of each change action. For more information, see Viewing Implementation Status.

To create an engineering change order record:

1. Go to Lists > Engineering > Engineering Change Order > New (Administrator).
2. Use the following table to complete the Primary Information section.

Field	Description
ECO Type	Select the type of change order.
Problem	Enter the reason for the change order.
Description	Enter details of the reason for the change order.
Date	Creation date is set to today's date by default. You may set this to a future date.
Effective Start Date	Use the calendar to set the date when the change order becomes effective.
Effective End Date	Use the calendar to set the date when the change order becomes obsolete. The effective end date is not mandatory.
Subsidiary	If you use NetSuite OneWorld, select a subsidiary.
Approval Status	This is set to Pending Approval, by default.
Next Approver	Displays a value after the ECO enters the approval workflow, depending on the approval rule.
Implementation Status	Displays a value when the ECO is approved or implemented. For more information, see Setting Engineering Change Order Preference and Implementing Engineering Change Orders.
Inactive	Leave this box clear to keep the ECO record active.

Note: Ensure you selected a subsidiary (NetSuite OneWorld) before entering product change details. You can select only those items and assembly items associated with the selected subsidiary.

You enter BOM change details on the **Product Changes** subtab.

3. Click **Add BOM Changes**.
4. In the Add Change popup window, in the **Action** list, select the change action you want to add.

   Refer to the following table for instructions on each change action.

Action	Procedure
Add	1. In the **Item** field, enter the name of the item you want to add to a BOM. **Note:** The field returns search results as you enter text. 2. Click **Add BOM Change**. 3. In the change line-item: ▪ Click the field under **Assembly Item** and enter the assembly affected by the change. The field returns search results while you enter text. ▪ Under **Quantity**, enter the quantity of the item you want to add. The default value is 1. ▪ Update the **Change Component Yield** field, as necessary. The field has no value if the Use Component Yield feature is not enabled for the affected assembly item. For more information, see Component Yield Preferences. ▪ Select the **BOM** to which the item will be added. All BOMs associated with the affected assembly items are available for selection. ▪ Select the affected **Revision** of the BOM. ▪ Enter the **New Revision** of the BOM after the change is implemented. ▪ Repeat Steps 2 and 3 to enter more **Add** change lines for the same item. **Important:** Changing the action or item removes any change line-items already added. To enter a replacement change or remove an item from a BOM, first save the open Add Change popup window. Refer to the **Remove** and **Replace** procedures in the following rows. 4. Click **Save**. 5. Review the change details and click **Save**.
Remove	1. In the **Item** field, enter the name of the item you want to remove from a BOM. **Note:** The field returns search results as you enter text. 2. Click **Add BOM Change**. 3. In the change line-item: ▪ Click the field under **Assembly Item** and enter the assembly affected by the change. The field returns search results while you enter text. ▪ The **Quantity** and **Change Component Yield** fields are disabled by default. ▪ Select the **BOM** from which the item will be removed. All BOMs associated with the affected assembly items are available for selection. ▪ Select the affected **Revision** of the BOM.

Action	Procedure
	■ Enter the **New Revision** of the BOM after the change is implemented. ■ Repeat Steps 2 and 3 to enter more **Remove** change lines for the same item. **Important:** Changing the action or item removes any change line-items already added. To add or remove an item from a BOM, first save the open Add Change popup window. Refer to the **Add** and **Replace** procedures in this table. 4. Click **Save**. 5. Review the change details and click **Save**. **Note:** This change action removes the entire quantity of the item. The feature does not allow removal of partial quantity.
Replace	1. In the **Item** field, enter the name of the item you want replaced in a BOM. 2. In the **Item Replacement** field, enter the replacement item. **Note:** The **Item** and **Item Replacement** fields return search results as you enter text. 3. Click **Add BOM Change**. 4. In the change line-item: ■ Click the field under **Assembly Item** and enter the assembly affected by the change. ■ Enter the **Quantity** of the item to be replaced. ■ Enter the **Change Component Yield** value. The field is disabled if the Use Component Yield feature is not enabled for the affected assembly item. For more information, see Component Yield Preferences. ■ Select the **BOM** in which the item will be replaced. All BOMs associated with the affected assembly items are available for selection. ■ Select the affected **Revision** of the BOM. ■ Enter the **New Revision** of the BOM after the change is implemented. ■ Repeat Steps 2 and 3 to add more **Replace** change lines for the same item. **Important:** Changing the action or item removes any change line-items already added. To add or remove an item from a BOM, first save the open Add Change popup window. Refer to the **Add** or **Remove** procedures in this table. 5. Click **Save**. 6. Review the change details and click **Save**.

Important: You can update the product change details in the Add Change popup window. However, the primary information values on the ECO record cannot be changed.

Note: Use the **Process Changes**, **Notes**, and **Documentation / Files** subtabs, as needed. Instructions are available in the following steps.

Use the **Process Changes** subtab of the ECO record to enter process change information for documentation and approval purposes.

5. Click the **Process Changes** subtab.
6. In the **Process Description** field, enter details of the process change.
7. The **Date/Time** field displays the timestamp of the record at save.

If you edit the ECO record, the timestamp adjusts to the current date and time.

Note: ECO records for process changes go through approval. Ensure that you create approval rules for these change types. For more information, see Approval Rules for Engineering Change Order.

8. Click the **Notes** subtab.
9. Name the information you are adding under the **Title** column.
10. Add details under the **Memo** column.
11. Select the **Type** of your note as needed.
12. Select the **Direction** of your note as needed.
13. Click **Add**.
14. Repeat steps 9 through 13 to add more notes.
15. Click the **Documentation / Files** subtab.
16. Attach required or relevant documents and materials about the ECO. For information about attaching files, refer to Working with Files.
17. Click **Save** when the ECO record is complete.

Copying an Engineering Change Order Record

Use the following procedure to copy an engineering change order record.

To copy an engineering change order record:

1. Go to Lists > Engineering > Engineering Change Order.

Important: The Make Copy function for ECO records does not support the duplication of Product Changes entries onto the copy.

2. On the **Engineering Change Order List** page, locate the ECO record you want to copy.
3. Click the **View** link for the ECO record.
4. On the ECO record, select **Make Copy** under **Actions**.
5. Make changes in the Primary Information fields, as needed.
6. Click **Save**.

Approving or Rejecting Engineering Change Orders

Note: Only approvers from the subsidiary of the creator of an ECO can access and approve the ECO.

You use the email notifications generated by SuiteApprovals to view and take action on the ECO records for your approval.

To approve or reject an engineering change order:

1. Open the email message.

2. Review the ECO Number and Problem Statement.
3. Click **View Record** on the email body.
4. On the ECO record, click the button for the action you want to take on the ECO.
   - **Approve** - If you are the only approver or the final approver, the ECO becomes approved. Otherwise, the record is routed to the Next Approver.
   - **Reject** - The ECO is rejected. You must enter a reason for your rejection of the record.
5. Click **Submit**.

Resubmitting Engineering Change Orders for Approval

Within the SuiteApprovals workflow, ECO records in **Approved** or **Pending Approval** status cannot be edited. You can update and resubmit only a **Rejected** ECO record. Note the following when resubmitting ECO records for approval:

- The ECO creator and users with access to the ECO, except the current approver, can update and resubmit the record.
- The user who originally submitted the ECO record cannot be an approver.

To resubmit an engineering change order for approval:

1. Go to Lists > Engineering > Engineering Change Order (Administrator).
2. Search for the ECO record you want to resubmit using filters and sorting tools, as needed.
3. Click the **Edit** link for the ECO record you want to edit and resubmit for approval.
4. On the ECO record, click **Resubmit**.

The resubmitted record is revalidated and either exits the workflow, or is routed for approval. Email notifications are sent to specific recipients depending on the changes applied to the record and the workflow state the record is in.

Implementing Engineering Change Orders

If you have not set the feature's **Implement Engineering Change Order Upon Final Approval** preference, an ECO administrator must manually implement approved ECO records.

To implement approved engineering change orders:

1. Go to Lists > Implement Engineering Change Order (Administrator).
2. Use filters to search for approved ECO records:
   - Use the calendar to search by effective date range. Today's date is the default date.
   - Select a subsidiary.
3. The page lists matching records, if any.
   - To implement all records in the list, click **Mark All**. To implement only specific ECO records, check the **Select** box for the record.
   - Use the pagination controls as needed to make selections.
4. Click **Implement**.

   To view the implementation status of an ECO record, see Viewing Implementation Status.

Note: Set the **Implement Engineering Change Order Upon Final Approval** preference to automatically implement approved ECOs. See Setting Engineering Change Order Preference.

Viewing Implementation Status

The Engineering Change Order Log section lets an ECO administrator view the implementation status of any approved ECO.

To view the implementation status of engineering change orders:

1. Go to Lists > Engineering > ECO Implementation Status (Administrator).
2. The Engineering Change Order Log section lists all active ECO records.
3. Select a value in the **Implementation Status** list to filter the list:
   - **Pending** - Approved ECO records that have yet to be implemented
   - **In Process** - Implementation is in progress for approved ECO records
   - **Completed** - Implemented ECO records
   - **Error** - Approved ECO records with implementation error
4. Click **Go to Main** to return to the full list from a filtered list. Click **Refresh** to display the most recent data.

To view the implementation status of action changes in approved engineering change orders:

1. Go to Lists > Engineering > Engineering Change Order (Administrator).
2. On the Engineering Change Order List page, search for the ECO record you want to view. Use the filters or sorting tools, as needed.
3. Click the **View** link of the ECO record.
4. Click the **Product Changes** subtab.
5. View the implementation status of each change line-item under the **Is Implemented** column.

   Note: You may need to click the collapse (-) icon for a change line to view its implementation status.

Viewing Approval History

Use the following procedure to view approval history.

To view the approval history for an engineering change order:

1. Go to Lists > Engineering > Engineering Change Order (Administrator).
2. On the Engineering Change Order List page, search for the ECO record you want to view. Use the filters or sorting tools, as needed.
3. Click the **View** link of the ECO record.
4. Click the **Approval History** subtab.