

Oracle SCM Cloud

Using Production Scheduling

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1 Introduction

Why You Use Production Scheduling

Before answering the question, let's recap what we know about the manufacturing process. Your manufacturing application calculates start times and end times based on the work order start or completion date. The application accounts for the duration of resource usage, but it assumes that your resources have unlimited capacity; it then potentially plans to execute production for multiple work orders simultaneously.

Why Resource Constraints Must Be Considered

Let's say your shop floor has just two machines that can be used for 10 hours a day, due to defined resource or shift exceptions. You need to make 10 items by the end of today and each item takes two hours to make. This means that by your deadline, you can make just half the required number of items because of capacity constraints on your resources. Because your shop floor might be executing more than one work order at a time, daily constraints on resource capacity must be considered.

How Production Scheduling Helps

Using Oracle Fusion Production Scheduling, you can consider resource capacity constraints and the changeovers on resources that occur throughout production. You can generate a feasible and executable schedule by considering resource capacity and resource availability, attribute-based changeover rules, component availability, and multistage dependencies based on work definitions and item structures. Using changeover rules you can reduce changeover times to increase throughput and reduce lateness of work orders.

How to Enable the Production Scheduling Work Area

To enable the Production Scheduling work area, you must perform two setup tasks.

You can perform these tasks in any order, but you must do both before a user can access the work area.

- Opt in to the Production Scheduling feature
- Assign a job role to the applicable users

Opt In to the Production Scheduling Feature

You perform this opt in one time for your overall site.

- Offering: Supply Chain Planning
- Feature: Production Scheduling

For more information regarding how to opt in to features, refer to the Using Functional Setup Manager guide, Offering Configuration chapter in the Oracle Help Center.

Assign the Applicable Job Role to the Applicable Users

Assign the predefined Production Scheduler job role, or a job role that your enterprise defined with similar privileges, to the user associated to each of your production schedulers.

For more information regarding how to assign job roles to users, refer to the Securing SCM guide, Role Provisioning chapter in the Oracle Help Center.

Related Topics

- [Role Provisioning and Deprovisioning](#)
- [Overview of Configuring Offerings](#)

Production Scheduling Tasks and Business Flows

To carry out production scheduling tasks, you must have production scheduler privileges by your enterprise. This topic is an overview of the tasks and the business flows in the Production Scheduling work area.

Locate the Work Area

Navigate to the Supply Chain Planning cluster and click Production Scheduling.

Know Your Workflow

Here's the sequence of production scheduling activities:

1. Add and set up scheduling organizations.
2. Create a schedule.
3. Refresh, solve, review, and adjust the schedule.
4. Release the schedule.

Begin Your Business Tasks

From the Production Schedules page, you can manage production schedules and scheduling organizations.

- Before creating a schedule for an organization, this organization must be defined as a scheduling organization. Click the **Manage Scheduling Organizations** button to add, manage, and delete scheduling organizations. To know more, refer to the Organization Setup chapter.
- To create a schedule, click **Create** on the Production Schedules page to define and configure your schedule. To know more, refer to the Schedule Setup chapter.
- To work with an existing schedule, use the actions menu for that schedule. To know more, refer to the Schedule Processes chapter.

2 Organization Setup

Overview of Scheduling Organizations

You schedule production for work centers in manufacturing organizations, which we refer to as scheduling organizations in the Production Scheduling work area. Before you create a schedule for an organization, you need to add the organization as a scheduling organization. You can add and set up a scheduling organization using the **Manage Scheduling Organizations** task on the Production Schedules page.

Add or Remove Scheduling Organizations

Scheduling organizations are sourced from Oracle Fusion Manufacturing, and you manage them in the Manage Scheduling Organizations UI.

- To add a scheduling organization, click the **Add** button.
- To remove a scheduling organization, click the **Delete** button from the actions menu.

Note: Removing an organization from the Production Scheduling work area does not delete it from other work areas.

Manage Organization Data

Review and manage organization data, such as attributes, changeover rules, item parameters, and resource parameters, using the actions menu. The refresh applies to information that was defined using descriptive flexfields in Oracle Fusion Manufacturing and extensible flexfields in Oracle Fusion Product Information Management

Refresh Organization Data

Use the Refresh action to retrieve the most recent attribute values for an organization. The refresh applies to manufacturing attributes, defined using descriptive flexfields for work definition operations in Oracle Fusion Manufacturing, and item attributes, defined using extensible flexfields in Oracle Fusion Product Information Management.

Note: You can't refresh data before attribute groups are added using the Manage Attributes page.

Attributes

Attributes are aspects of your items or work definition operations that impact scheduling. For example, if your organization manufactures ice cream, multiple attributes, such as flavor and size, might be considered, and combinations of these attributes are referred to as attribute groups.

To manage attributes, open the actions menu for an organization and click **Attributes**.

Tip: Refresh organization data after adding manufacturing and item attributes.

Manufacturing Attributes and Attribute Groups

Manufacturing attribute groups are sourced from work definition operations in Oracle Fusion Manufacturing, where they're defined as descriptive flexfields; manufacturing attribute values are contained in descriptive flexfield value sets. In the Manufacturing Attribute Groups tab, add manufacturing attributes by clicking **Add** and selecting an attribute group.

Item Attributes and Attribute Groups

Item attribute groups are sourced from Oracle Fusion Product Information Management, where they're defined as extensible flexfields; item attribute values are contained in extensible flexfield value sets. In the Item Attribute Groups tab, add item attributes by clicking **Add** and selecting an item class and attribute group.

Attribute-Resource Assignments

You need to assign relevant attributes to specific resources using the Resource Attributes tab. These assignments are a prerequisite to defining changeover rules. To assign an attribute to a resource, you first select a work center. You then pick the resource and specify the attribute you're assigning. You can also dissociate an attribute from a resource using the **Delete** action.

Attribute Value Color-Coding

To support schedule analysis, you can color-code attribute values, and use the highlighting features of the Gantt Chart to focus on specific attributes across operation sequences. Here's how:

1. Open the **Attributes** page for an organization.
2. Click the **Attributes** tab.
3. Specify whether an attribute can be used for highlighting in the Gantt chart.
4. Click the **Attribute Values** button.
5. Use the color picker tool to specify the color used to highlight this attribute.

Attribute color assignments can be also defined and managed using REST services. To know more, refer to the REST API for Oracle Supply Chain Management Cloud guide.

Resource Parameters

Use resource parameters to define changeover-related and constraint-related aspects of a resource. To manage resource parameters, open the actions menu for an organization and click the Resource Parameters option.

Define Resource Parameters

Note: You can use the default parameter values listed at the end of this topic.

1. On the Resource Attributes page, click the **Add** button.

2. Select the work center.
3. Select a resource.
4. Select a constraint mode.
 - If you select **Constrained**, the solver will respect both calendar events and resource capacity constraints.
 - If you select **Relaxed**, the solver ignores calendar events and resource capacity constraints.
 - If you select **Relaxed for capacity only**, the solver will respect only calendar events.
5. Select the changeover calculation type.
 - Use **Concurrent** when multiple attribute changes need to occur simultaneously. The solver will consider the maximum duration of all attribute-based changeover rule durations.
 - Use **Sequential** if multiple attribute value changes need to happen in sequence. The solver will consider the sum of all attribute-based changeover rule durations.
6. Select the changeover position.
 - Use **Cleanup** if attribute-based changeovers on the resource should happen when an operation ends.
 - Use **Setup** if attribute-based changeovers on the resource should happen before an operation begins.
7. Specify whether the horizon start date and time must be enforced.
 - When **Enforce horizon start** is enabled, all work order operations will be scheduled to begin after the horizon start.
 - **Note:** This preference will be overridden if the solver was configured to respect firm work orders in the Schedule Options UI.
 - If you disable it, then firm work order operations can be scheduled to begin before the horizon start.
8. Specify whether the user-defined attribute sequence will be applied.
 - If you enable **Apply user-defined attribute sequence**, the solver uses the attribute sequence you defined using the resourceAttributeSequences REST service.
 - If the setting is left disabled, the solver devises an attribute sequence.
 - For the user-defined sequence to be applied, the schedule must be configured to use scheduling buckets using the Schedule Options UI.

■ **Tip:** Apply the user-defined sequence to a single stage in the production process, preferably to a bottleneck stage.

If you don't configure parameters for any resource in your schedule, the following default values will be considered:

- Changeover Calculation: Concurrent
- Changeover Position: Setup
- Constraint Mode: Relaxed
- Horizon start date: Enforced
- User-defined attribute sequence: Not considered

Resource Groups

Use resource groups to simplify data maintenance and schedule analysis.

- Simplify changeover rule definitions using resource groups instead of resources. For example, you can use a single changeover rule for a group of resources, instead of defining rules for each resource individually.
- Focus on a set of resources for schedule analysis via the Gantt Chart. You can select a set of resources to view operations and adjust the schedule only for those resources.
- Include outside supplier resources that will be relaxed for capacity.

Tip: Limiting the number of resources displayed in the Gantt Chart will improve application performance.

Define a Resource Group

1. In the actions menu for an organization, click Resource Groups.
2. On the Resource Groups page, click Add.
3. Specify a name and description.
4. Select whether to include an outside processing supplier.
5. Save your group.

When you've created a group, add group members to it.

Define a Resource Group Member

1. In the actions menu for a resource group, click Members.
2. Specify the sequence number, to define the order in which the resource appears in the Gantt chart.
3. Select a work center.
4. Select a resource.

Resource groups can also be defined and managed using the **Supply Chain Planning/Production Scheduling Organizations/Resource Groups** REST service. To know more, refer to the REST API for Supply Chain Management guide.

Changeover Rules

Use changeover rules to specify the time it will take to prepare a resource for the production of an item. Preparation activities are cleanups or setups that must be done when the item being produced on a resource changes. To manage changeover rules, open the actions menu for an organization and click the **Changeover Rules** option.

Define a Changeover Rule

1. On the Manage Changeover Rules page, click **Add**.

2. Specify a sequence number to indicate when the changeover occurs. You can use decimal values.
3. Select either the resource group or the work center and resource. You can edit all fields using the REST service.
4. Select the attribute on which the changeover will occur.
5. Select the current and changed attribute values
6. Specify the duration of the changeover and the duration unit of measure.
7. Specify the cost of the changeover. It's considered when the user-defined attribute sequence is set to **Reverse**.

During schedule calculation, if multiple changeover rules are applicable between two work order operations, then the rules with a lower sequence number are applied. Hence the more specific rules with respect to resources, attributes, and attribute values should be assigned lower sequence number and the more general catch-all type rules should be assigned higher sequence number.

Changeover rules can also be defined using the **Supply Chain Planning/Production Scheduling Organizations/Changeover Rules** REST service. To know more, refer to the REST API for Oracle Supply Chain Management Cloud guide.

User-Defined Attribute Sequences

You can define an attribute sequence for use in scheduling and specify how the sequence is considered using a cycle rule.

The following settings must be enabled so that the solver considers the sequence you define:

- **Apply user-defined attribute sequence**, for applicable resources, in the Resource Parameters UI.
- **Use scheduling buckets**, in the Schedule Options UI.

Define an Attribute Sequence

1. Open the action menu for an organization.
2. Click **Resource Parameters**.
3. Set the **Apply User-Defined Attribute Sequence** value to Yes.
4. Open the action menu for the resource.
5. Click **Attribute Sequence**.
6. Click **Add**.
7. In the dialog box, select an attribute, its sequence number, and its cycle rule.
8. Click **OK**.

Note: Define attribute sequences on a single production stage only to prevent contradictory scheduling behavior.

You can also define defined attribute sequences using the Supply Chain Planning/Production Scheduling Organizations/Resource Attribute Sequences REST service. To know more, refer to the REST API for Oracle Supply Chain Management Cloud guide.

Define an Attribute Value Sequence

1. Go to the **Attribute Sequence** UI.

2. Open the action menu for an attribute.
3. Click **Attribute Value Sequence**.
4. Open the action menu for an attribute value.
5. Specify the sequence number.
6. Click **OK**.

How the User-Defined Sequence Is Used

Production Scheduling considers the user-defined sequence for each scheduling bucket. The scheduling bucket in which a work order will be scheduled is based on the Need-by Date or the Need-by Override. If there are more work orders than can be accommodated in a scheduling bucket, it will continue with the sequence into the next scheduling bucket until all work orders assigned into that bucket are sequenced.

How Cycle Rules Are Used

Production Scheduling cycles through the user-defined sequence based on the sequence numbers of the attributes and attribute values. You use cycle rules to set the behavior of the user-defined sequence at the start of a scheduling bucket. A cycle rule can be set to restart, continue, or reverse.

- If you select Restart, the attribute value sequence restarts for the new scheduling bucket, in the order of the user-defined sequence. This can effect changeovers across scheduling buckets.
- If you select Continue, the attribute value sequence continues through the new scheduling bucket. This will reduce changeovers across scheduling buckets but will restart the sequence in order.
- If you select Reverse, the attribute value sequence can potentially reverse for the new scheduling bucket. This can be useful when you need to cycle up and down a user-defined sequence. For example, by going from Small to Large and then back down from Large to Small.

Note: Alternate resources must use the same cycle rule, attribute sequence, and attribute value sequence as the primary resource to prevent contradictory scheduling behavior.

Data Setup Reference for Scheduling Organizations

If you can't find data you're looking for while adding and configuring organizations to associate with a schedule, you might need to verify if it was set up in another work area. This table lists such data objects and the work areas they're set up in.

Data Object	Work Area of Origin
Organizations	Setup and Maintenance
Manufacturing attributes	Setup and Maintenance, as descriptive flexfields.
Item attributes	Setup and Maintenance, as extensible flexfields
Work definitions	Supply Chain Execution

Data Object	Work Area of Origin
Resources, resource capacity and resource availability	Supply Chain Execution

Note: Only users with security privileges to access the work area of origin can verify these setups. These privileges are granted by your enterprise administrator.

Related Topics

- [Overview of Flexfields](#)

3 Schedule Setup

Overview of Schedule Options

Use the Schedule Options page to set up your production schedule and to configure how it gets solved.

While creating a new schedule, you first define schedule options. To edit schedule options for an existing schedule, open the action menu for that schedule and click **Schedule Options**.

Set Up and Configure a Schedule

1. On the Manage Schedule Options page, specify a schedule name and a description.
2. Define the schedule scope. This includes the schedule horizon, the organization you want to schedule production for, and item catalogs and categories.
3. Configure schedule parameter values by defining scheduling horizons and fixed time fence settings.
4. Configure advanced schedule parameter values by defining resource allocation priorities and scheduling bucket specifications drive algorithmic decisions during schedule generation
5. Configure the schedule display by specifying which resources are displayed by default in the Gantt Chart.

Schedule Scope

The scope determines what data gets considered for scheduling.

Define the Scope of Your Schedule

1. Select the scheduling organization that you want to schedule production for.
2. Specify the schedule horizon, which is the duration of the scheduling period from the horizon start date. The horizon start date is derived using the anchor date and time.
3. Specify a horizon to allow consideration of past-due demands. Demands that were supposed to be fulfilled before the horizon start date are termed Past-Due. Past-due demands within this horizon will be considered for scheduling.
4. Specify a horizon to allow consideration of past-due supplies. Supplies that were supposed to be available before the horizon start date are termed Past-Due. Past-due supplies within this horizon will be considered for scheduling.
5. Select an item catalog.
6. Select item categories.
7. Specify whether to schedule maintenance work orders. If you enable this setting, only maintenance work orders will be considered in the Gantt Chart and dispatch list. Maintenance work orders are also not considered in a manufacturing schedule.

Tip: You can improve scheduling performance by reducing the number of operation-resource records considered by the application. To do so, limit the schedule horizon, the number of items, or the past-due supply horizon.

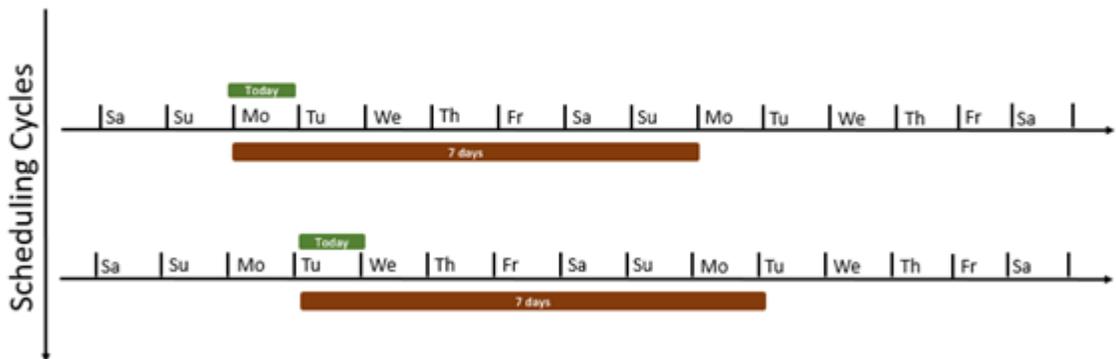
Schedule Parameters

Schedule parameters mark key horizon settings and determine scheduling behavior.

Configure Schedule Parameters

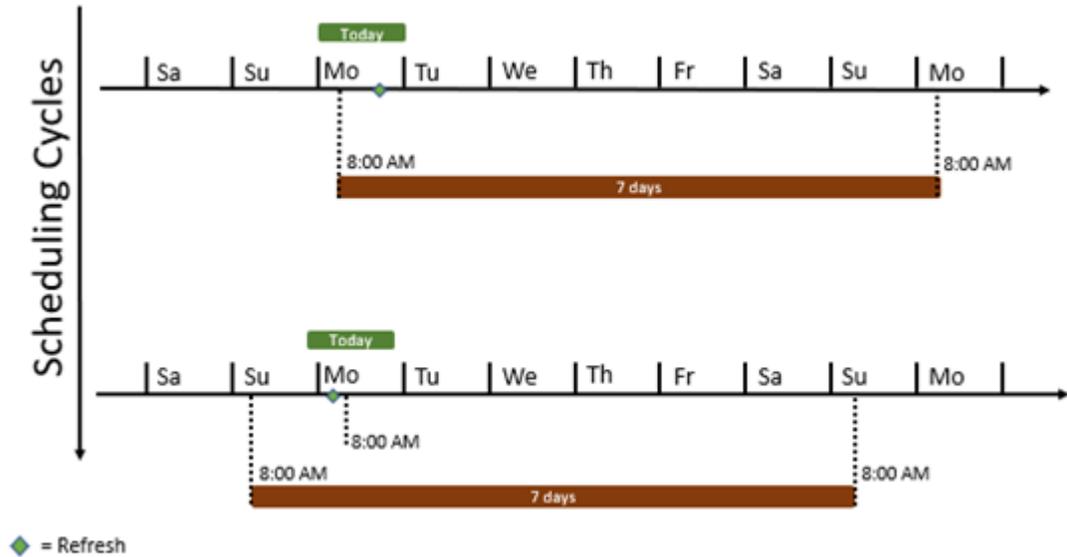
1. Specify the fixed time fence duration. Start dates of firm work orders defined in Oracle Fusion Manufacturing, and that fall within this horizon, will be respected.
2. Specify the horizon extension type to control how the application determines the horizon start and the fixed time fence.
 - o If you select **Rolling**, the duration of the fixed time fence stays constant while the start date shifts by a day, each day.
 - If the anchor time is midnight, and the schedule refresh is performed after midnight on the same day, the fixed time fence will be counted from midnight on that day, regardless of what time the schedule refresh is performed.

Fixed Time Fence In Days	Horizon Extension	Fixed Time Fence Minimum In Days
7	Rolling	4
Resource Constraint Horizon In Days	Anchor Date and Time *	Fixed Time Fence Extension In Days
30	04/20/2020 12:00 AM	7



- If the anchor time isn't midnight, let's say it's 8:00 a.m. today, and a schedule refresh is done after 8:00 a.m. today, then the horizon start and fixed time fence start is 8:00 a.m. today. But if a refresh

is performed before 8:00 a.m. on a given day, the horizon start time fence start will be 8:00 a.m. the previous day.



- o If you select **Dynamic**, the horizon start is the current day, and the time fence shrinks with each passing day until it reaches a time fence minimum duration. When this minimum value is reached, the time fence gets extended. If you select this extension type, you must also specify the time fence minimum duration and time fence extension duration.
 - The time fence shrinkage is the difference between the fixed time fence duration and the number of days between the current day and the last day of the time fence. So if the anchor date and time is Monday 12:00 a.m., the fixed time fence duration is 7 days, and you're refreshing the schedule at Thursday 12:00 a.m., the time fence has shrunk to 4 days. If you set the minimum as 4 days and the extension as 7 days, then from Friday 12:00 a.m., the time fence will have shrunk to 3 days,

which is below the limit of 4 days, and will extend by the extension duration of 7 days. This results in a total time fence duration of 10 days.



Tip: The dynamic mode works best if the fixed time fence duration is a multiple of 7.

3. Specify the resource constraint horizon, a duration that's counted from the horizon start date. Resource capacity constraints and calendar events within this horizon are respected during scheduling.
4. Select the anchor date and time, which is used to calculate the fixed time fence start, the schedule horizon start, and, if scheduling buckets are used, the scheduling bucket start date and time. The schedule horizon start and fixed time fence start will be the last time value of the anchor date and time before a schedule refresh; the scheduling bucket start will be the anchor date and time.
5. Specify the release horizon, a duration that's counted from the horizon start. Work orders with start dates within this horizon only will be released.
6. Specify whether to firm released work orders that begin during the fixed time fence period.
7. Specify the lateness tolerance in hours. Lateness tolerance is the number of hours from a Need By date by which a demand or work order is considered late by the application.

Advanced Schedule Parameters

Advanced schedule parameters like resource allocation priorities and scheduling bucket specifications drive algorithmic decisions during schedule generation.

Configure Advanced Schedule Parameters

1. Select the resource allocation priority type, on the basis of which the solver assigns work order operations to alternate resources.

- If you select **Earliest completion time**, work order operations are assigned to resources that allow them to be completed relatively sooner.
- If you select **Changeover and idle time aware**, work order operations are assigned to resources such that changeover and idle time is minimized locally.

2. Specify whether to use scheduling buckets.

If the **Use scheduling buckets** setting is enabled, the schedule horizon is divided into buckets, and the scheduling bucket starts from the anchor date and time. If you enable this setting, you must also specify the scheduling bucket size.

Note: If you want to use buckets and the horizon extension is dynamic, your bucket must align with the fixed time fence, in that the end of the fixed time fence must match the bucket limit.

3. Specify whether to use accelerated dispatching.

If the **Use accelerated dispatching** setting is enabled, the solver uses a simplified algorithm for faster dispatching, used in scheduling models where only one production stage is constrained.

4. Specify whether to respect firm work orders within the fixed time fence.

If the **Respect firm work orders** setting is enabled, the application schedules firm work order operations such that their assigned start dates will be respected throughout the fixed time fence. Production Scheduling may move firm work orders outside the fixed time fence in order to respect constraints.

5. Specify the duration of a scheduling bucket.

6. Select whether to prebuild relaxed upstream resources.

When this setting is enabled, operations on a relaxed upstream resource will be scheduled regardless of when operations on a constrained downstream resource are scheduled to begin, which means upstream operations can complete well in advance of when downstream operations begin. If the setting isn't enabled, upstream operations will be scheduled to complete just as downstream operations begin.

7. Specify a prebuild maximum duration.

It's the number of days in advance of the Need-by Date, that a work order can be scheduled for. This duration determines the bucket to use for scheduling work orders that run on resources with a user-defined attribute sequence.

Note: The prebuild maximum duration is considered only when scheduling buckets are used.

8. Select whether to use the anchor date as the horizon start date.

If you enable this setting, the schedule horizon is no longer calculated from your local date and time but from the anchor date and time, making it constant. Then, the schedule data isn't affected by any differences between the anchor date and time and your current date and time. The past-due windows for both supplies and demands also stay constant with respect to the schedule horizon dates.

Schedule Display Settings

Schedule display settings determine the data that gets displayed in the Gantt chart in the schedule view UI. Select a default resource group for display in the Gantt chart; you can switch to another resource group later from the Gantt chart toolbar. You can perform this action only after refreshing the schedule. Limiting the number of resources to be displayed might improve application performance.

Data Setup Reference for Schedule Options

If you can't find values you're looking for while configuring a schedule, you might need to verify if they were set up in another work area. This table lists such data objects and the work areas they're set up in.

Data Object	Work Area of Origin
Scheduling organizations	Production Scheduling, added from the Manage Scheduling Organizations UI.
Items, item structures, item catalogs, and item categories	Product Information Management
Calendars and calendar constraints	Supply Chain Execution
Resources, resource capacity, and resource availability	Supply Chain Execution
Work Orders	Supply Chain Execution
Work Definitions	Supply Chain Execution

Note: Only users with security privileges to access the work area of origin can verify these setups. These privileges are determined by your enterprise administrator.

4 Schedule Processes

Overview of Schedule Actions

You can begin scheduling after your schedule has been set up.

Refresh and Solve a Schedule

Open the actions menu of a schedule to refresh or to refresh and solve a schedule.

- Click **Refresh** to update schedule data.
- Click **Refresh and Solve** to update schedule data and generate a new schedule.

You can review a schedule after either action, by clicking **Open** in the action menu. You can also solve the schedule using the **Solve** button in the schedule view.

Note: You must refresh a schedule after its last release, or else changes to the schedule for some work orders made after that release may not get released in the next one.

Analyze and Adjust a Schedule

In the actions menu for a schedule, click **Open** to enter the schedule view. Here's how you analyze and adjust a schedule:

1. Review schedule analytics.
2. Adjust the schedule using the interactive features of the Gantt chart and the focused data views.
3. Click **Repair** to implement your adjustments. It's best that you repair the schedule after every adjustment.

If you need to undo all your manual adjustments and repairs since the last solve process, click **Solve**.

Release a Schedule

Use release actions to review the number of work orders slated for release, and to release the schedule to your manufacturing application.

1. Click the **Release Schedule** button in the schedule view.
2. Review work order metrics.
3. Click **Release**.

Refresh and Solve Actions

Use the Refresh action to update your schedule data, such as work order data, attribute data, and resource capacity and availability. You can refresh a schedule at any time.

- A refresh discards the existing scheduling solution to make way for the new data, so if you need to retain an existing solution, release the schedule before refreshing it.
- A schedule refresh only updates the schedule with new data from Oracle Fusion Manufacturing, and the work order operations you see in the Gantt chart will be as retrieved from Manufacturing.

If you want the solver to automatically generate a new solution after a refresh, click **Refresh and Solve**.

Tip: If you need to review a refreshed schedule before solving it, click the Refresh action, then open the schedule to review it. You can then solve it using the Solve action in the schedule view.

Schedule Analysis and Adjustment

Analysis and Adjustment Using the Gantt Chart

Review schedule analytics and use the Gantt Chart to review detailed aspects of your schedule using various filtering and highlighting features, and to perform manual schedule adjustments.

Analyze

- Before working with the Gantt Chart, you can review these analytics:
 - **Late Work Orders:** Number of work orders scheduled for completion after their need-by dates.
 - **Changeover Time:** Sum of all changeover time durations.
 - **Labor Utilization:** Percentage of labor resource usage
 - **Equipment Utilization:** Percentage of equipment resource usage.
- In the Gantt chart toolbar, select a resource group. Use the **Resource Group** list to specify whether to review data for all resources or for a group of resources for schedule analysis.
 - Note:** When the Default Units Available value for a work center resource is more than 1, you can review resource levels using colors in the Gantt chart. Individual operations aren't displayed.
- Identify late work orders, using the **Highlight Late** action.
- Identify firm work orders, using the **Highlight Firm** action.
- Identify specific work orders or items. Use the **Filter By** and **Filter Value** fields to identify specific work orders or work orders that produce specific items. More information is displayed when you hover over an operation in the Gantt chart.
 - Note:** The Filter By values Asset and Type apply to Maintenance work orders only.
- Identify operations by attribute. Use the **Highlight Attribute** options to select an attribute in order to highlight all work orders or items defined with that attribute. For example, if your attribute is Pack Size, then all operations with the Pack Size attribute will be highlighted, and those with the same pack size value will be displayed in the same color that was assigned to that size.

- Identify task dependencies. Select any operation to view upstream and downstream operations in the work order routing, indicated with arrows.
- Identify and review idle times, changeovers, and downtime events.

Adjust

You can change resource assignments and manage downtime events in the Gantt Chart.

- Change the resource or start time for an operation.
 - a. Move an operation from a resource to an alternate resource by dragging and dropping it, or move it backward or forward in time on the same resource. You can also select a sequence of operations to drag and drop.

Note: For resource offloading to work within Production Scheduling, the resource sequence number of the work order operation must match the resource sequence number of the work definition operation in the Supply Chain Execution work area.
 - b. Specify the operation start time and click **Save**. If you selected multiple operations, specify the new start time of the first operation in the sequence.
 - c. Click **Repair** to ensure that the schedule accommodates the adjustment.
- Manage downtime events.
 - Add a downtime event.
 - i. Right-click on the schedule.
 - ii. Click **Add Downtime**.
 - iii. Specify the work center, resource, start time, and end time.
 - iv. Click Save.
 - Edit or delete a downtime event by right-clicking on it and clicking **Edit Downtime** or **Delete downtime**. You can also select a set of downtime events to drag and drop or edit and delete.

Click **Solve** to ensure that the schedule accommodates the new downtime.

Note: The solve process discards manual adjustments, including those saved using the **Repair** action, and calculates a new schedule.

Analysis and Adjustment Using the Dispatch List

Use the dispatch list to review and manage operation start times and sequences on a specific resource.

Analyze

Select a resource from the resource list, and review operation details for each work order. Filter for relevant columns by using the View By field to review only scheduling attribute data, customer service data, maintenance work order data, or work order operation data. For more work order information, you can click the View Work Order icon in the Work Order Column to view the work order in the Supply Chain Execution work area.

Adjust

Here's what you can do to manage operation start times and operation sequences.

- Change the sequence of work order operations. Use the sequence arrows to move an operation or block of consecutive operations ahead of or behind other operations. Repair the schedule to save your sequence.
- Change an operation's start time. Double-click the Start Time cell for a work order and specify the date and time. Repair the schedule to save this change.
- Override the need-by date. Double-click the Need-by Override cell for a work order and specify the date and time; then solve the schedule to save the override. The solve process uses the new date to target the work order's completion. The override date isn't released to your manufacturing application when you release the schedule.

Note: The solve process discards manual adjustments, including those saved using the repair process, and calculates a new schedule.

Analysis and Adjustment Using Work Orders

Use the Work Orders table to review and adjust work orders. You can also filter records by work orders or produced items. For more work order information, you can click the View Work Order icon in the Work Order Column to view the work order in the Supply Chain Execution work area.

Analyze

Review start and end times for each work order with their need-by dates to understand whether they will be completed on time.

Adjust

Here's what you can edit on a work order in order to influence scheduling.

- Change the Need-By Override Date.
- Change the Earliest Start Date.
- Change the Firm Status.

Note: Need-By Override and Earliest Start dates aren't released to the manufacturing application.

Note: The solve process discards manual adjustments, including those saved using the repair process, and calculates a new schedule.

Analysis Using On-Hand Inventory

Use the On-Hand Inventory table to review item on-hand inventory.

- You can filter data by items, item descriptions, or by a selection in the Gantt chart. Selection in the Gantt chart is only possible on single-capacity resources.
- When you select an item in the table, its consuming operations are highlighted in the Gantt chart. Highlighting is possible on single-capacity resources only. This readily helps you note the scheduling impact of unexpected supply delays.
- For more item quantity information, you can click the View Item Quantities icon in the Item column to view the work order in the Inventory Management work area.

Analyze

Use the On-Hand Inventory View to review on-hand supply, on-hold supply, and supply shortages for items.

- If there is more demand than supply, say, due to the cancellation of a work order, a shortage quantity is reported.
- Hold date is the date when an inventory lot that's currently on hold comes off hold and can be consumed. Inventory lots are listed only if their hold date is after the horizon start. All other inventory lot quantities are aggregated and displayed as the on-hand quantity.

Analysis Using Inbound Supplies

Use the Inbound Supplies table to review the impact of inbound material constraints on the schedule.

- You can filter data by items, orders, suppliers, supplier numbers, or by a selection in the Gantt chart. Selection in the Gantt chart is only possible on single-capacity resources.
- When you select an order in the table, its consuming operations are highlighted in the Gantt chart. Highlighting is possible on single-capacity resources only. This readily helps you note the scheduling impact of unexpected supply delays.

Analyze

Review inbound quantities and their requested dates for purchase orders or transfer orders to know whether they'll arrive on time. Orders are including for scheduling based on the schedule options.

- Purchase orders are included if their requested date falls within the schedule horizon and the horizon to include past-due supplies.
- Transfer orders are included if their Expected Delivery date or Need-By date falls within the schedule horizon and the horizon to include past-due supplies.

Release Analysis and Actions

Click the Release Schedule button in the schedule view page to view the number of work orders for release and to find the release action that sends the schedule to your manufacturing or maintenance application.

Work Order Metrics

Review these metrics about the work orders you're about to release:

- **Work Orders:** Number of work orders in the schedule.
- **Within Release Horizon:** Number of work orders that fall within the release horizon defined in the Schedule Options UI.
- **Within Release Horizon and Rescheduled:** Number of work orders within the release horizon which were updated through repair or solve processes.

Release and Integration

To release a schedule, click the **Release** button. The following data in your manufacturing application is updated with released information:

- Work order header start and end times
- Work order operation start and end times
- Work order operation resource assignments
- Work order status, now changed to **Released**
- Firm status for non-firm work orders within the fixed time fence horizon, now marked as firm, provided that the **Firm work orders that begin during the fixed time fence period** setting was enabled during schedule configuration.

Note: If the schedule wasn't refreshed after the previous release, changes to the schedule for some work orders may not be released.

5 Troubleshooting and Best Practices

Troubleshoot Production Scheduling Setup Issues

The data you use in Oracle Fusion Production Scheduling is sourced from other products like Oracle Fusion Manufacturing and Oracle Fusion Product Management. If you can't find data while setting up organizations and schedules, that's possibly because this data wasn't set up in their source work areas. Refer to the data setup reference topics at the end of every chapter for information about the work areas the data covered in that chapter is set up in.

Access to these work areas is granted by your enterprise administrator by means of roles, privileges, and additional security entitlements.

Tip: Provide your administrator the information in the data setup reference topics so that they can help you find answers to specific setup-related questions easily.

For an exhaustive list of security roles, privileges, and other access entitlements refer to the Security Reference for Supply Planning.

Troubleshoot Production Scheduling Performance Issues

If your production scheduling requests take too long to complete,, it's possibly because of the schedule or organization configuration. This topic covers best practices and related configuration settings to optimize scheduling performance.

Reduce the Scope

Use the Schedule Options UI to limit the scope of the production schedule to what is essential.

- Specify a short schedule horizon. For example, if a schedule is generated every day, and the longest lead times are less than a week, then having a schedule horizon of several months adds no value, but unnecessarily increases the data volume and the size of the schedule.
- Select only those item categories that need to be included in the schedule.

Note: In the Product Information Management work area, item categories can be defined with scheduling needs in mind. This would allow for scope definitions with items that are actually relevant to scheduling. Access to the Product Information Management work area is managed by your administrator.

Limit Resource Constraints to Bottleneck Resources

Use the Resource Parameters UI to control the constraint mode of a resource. Use the **Constrained** value for such cases, and for others use **Relaxed** or **Relaxed for capacity only**. The default mode is Relaxed.

Use a Resource Constraint Horizon

In the Schedule Options UI, specify a resource constraint horizon to specify the length of time during which capacity constraints are enforced. The horizon is calculated from the schedule horizon's start date. Beyond the constraint horizon period, constrained resources will be considered relaxed.

Review the Number of Records for Production Scheduling Objects

Use REST services to retrieve and review the volume of data you're working with for specific production scheduling objects, like items, resources, and work orders.

Review Request Logs for Production Scheduling Processes

A log file is created during production scheduling processes, like refreshes, solves, and releases. To view details of any process warnings or errors, copy the process request ID from the Production Schedules page and use it to search for the request log file in the Scheduled Processes UI.