Oracle Field Service Cloud

Using Routing Cloud Service

19C
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Preface

This preface introduces information sources that can help you use the application and this guide.

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1 Overview of Routing

Routing Definitions

Routing automates many routing tasks, making the process faster and easier and ensures that properly skilled resources are assigned activities within their working areas. Routing satisfies more customer activities within the promised service window. It minimizes the cost of delivering service by minimizing resource travel time, work time, idle time and overtime.

Routing Process

Oracle Field Service Cloud Routing Cloud Service leverages a sophisticated algorithm to optimize resource utilization. It learns about your resources and activities through the information you enter and through the real-time data that it collects about resources and activities. The application then uses this information to generate routes that optimize the mobile workforce utilization details.

Oracle Field Service Cloud Routing Cloud Service includes the logic to consider the resource arrival time communicated to the customer, so that the company’s commitments can be fulfilled. If the customer has been notified of the arrival period (both the start and end time of the arrival period have been communicated), and such arrival period overlaps the Service Window, the module uses this overlap as the interval within which the activity start is preferred to be scheduled.

The data flow of the routing process is as follows:

- Oracle Field Service Cloud receives activities from the activity booking system. The application identifies the necessary skills and skill levels for the activity as well as any other requirements and then identifies resources with a matching set of skills, skill levels, working areas and other constraints. Then Oracle Field Service Cloud Routing Cloud Service assigns the activity to the resource that best matches the requirements. If a resource is selected as the Preferred resource for an activity, the resource is given priority. However, when a Preferred resource is inactive or unavailable, other appropriate resources are selected. The company realizes cost savings through efficiencies, resources receive routes that are tailored to their skill levels and their locations, and customers receive quality service on time.

- Oracle Field Service Cloud Routing Cloud Service always considers the assignment requirements established for activities and resources in Oracle Field Service Cloud. This includes - work skills, work zones, activities forbidden, required resources, activity links constrains and resource calendars. Routing plan level settings let you configure additional constrains and priorities; however, it is not possible to minimize the standard constrains at the plan level.

Note: Routes are optimized using a number of different goals, not just the ones that you select. For example, if you build a routing strategy that optimizes travel and work time, the application prioritizes not just the optimization of travel time and work, but it also maximizes a number of assigned activities and minimizes resources overtime as additional optimization goals.
Determining Resource Location for Use in Routing

When a resource is in the field, the application sends the GPS coordinates of the resource to the routing engine, if they are available. This helps Routing determine the location of the resource.

These rules are used:

If the route is not yet started or no activity is started on the route, the coordinates sent to the routing engine are as follows:

- If the resource's GPS coordinates are obtained between 0–20 minutes, the GPS coordinates are used.
- If no GPS coordinates are available, or if GPS coordinates are greater than 20 minutes, the resource's Start Location is used if it is available.
- If no GPS coordinates are available, or if GPS coordinates are greater than 20 minutes, and no Start Location is assigned to the resource then the resource's location remains undefined.

If the route has a started or a completed activity:

- If the resource's GPS coordinates are newer than the address of the started or completed activity and the resource is at a distance more than 20 minutes from the address of the started or completed activity (using airline distance and default company airline distance speed), the GPS coordinates are used.
- If no GPS coordinates are available, or if GPS coordinates are older than the address of the started or completed activity, or the resource is at a distance less than 20 minutes from the address of the started or completed activity (using airline distance and default company airline distance speed), the address of the started or completed activity is used.
2 Configure the Application for Routing

Resource Tree Structure Requirements

Oracle Field Service Cloud Routing Cloud Service uses a number of settings to decide how to match activities to resources. Your configuration of these settings can have a significant influence on the routing results. Verify that the resources that should receive the activities are in the same bucket as the activities that you want them to receive.

When organizing the resource tree consider the following limitations:

- Routing is started from a Routing Bucket—a resource type with the bucket role.
- Routing can only distribute activities from the routing bucket to child resources
- Only those child resources are considered for routing that have the Routing can assign activities option selected at the resource type level

See Oracle Field Service Core Manage Cloud Service User Guide for detailed instructions on configuring the Resource Tree.

Resource Calendar Requirements

Verify that your calendars are current and accurate. This information is used to determine whether a qualified resource is available to take an activity.

Note: Resources inherit calendars from parent objects such as buckets or organizations unless you override the settings at a lower level.

Tip: Put all of the resources that you want to use the same calendar in one bucket and assign the calendar to the bucket. The resources inherit the calendar settings from the bucket and you only have to configure the calendar once.

Work Skills and Work Skill Conditions

Verify that the work skills, work skill levels, and the work skill conditions that you configured are accurate. If you do not assign work skills to a resource, the application assumes that the resource has all of the work skills at the highest level.

Work skills: identify the expertise that a resource has. Work skills are the links that enable Oracle Field Service Cloud match activities with resources.

Work skill conditions: identify the work skills that are necessary to complete each activity.

The required level setting and the preferable level settings in the work skill have a strong impact on routing. The required level identifies the minimum work skill level that the resource must have to be eligible for the activity.
Tip: If the application is not able to match activities to resources, consider relaxing your work skill levels and work skill conditions so that more resources match the work skills and work skill levels required by the activities.

See the Oracle Field Service Cloud Capacity Cloud Service User Guide for detailed instructions for configuring work skills and work skill conditions.

Work Zones

If you are using work zones, verify that work zones and activities are accurately configured for your resources. In addition, ensure that the work zone dictionary is correctly configured to assign activities with correct work zones. Activities that support work zones on activity type level must have all the fields that are used in work zone key correctly populated.

You can use work zone levels to influence which work zones they receive work in. Assign a higher level to more desirable work zones and a lower level to less desirable work zones. Resources inherit work zones from parent objects like buckets or organizations unless you override the setting at a lower level.

Tip: If Oracle Field Service Cloud Routing Cloud Service is not able to match activities to resources, consider assigning each work zone to more resources so that more resources are available for the activities in that work zone.

Resource Start and End Locations

Start and End locations can be defined for a resource. Oracle Field Service Cloud Routing Cloud Service considers the travel time from start location to first activity and travel time from last activity to end location.

To configure locations, click Settings > Locations. Home zone center locations can also be defined here.

See the Oracle Field Service Core Manage Cloud Service User Guide for detailed instructions about configuring Locations.

Resource Preferences

You can specify preferred resources for different activities. These requirements are taken into account when routing activities. These settings are enabled in the activity type and are set on the individual activity.

The following preference settings are available:

- **Required:** Only resources identified as required can be assigned these activities.
- **Preferred:** When no resources are identified as Required, any resource defined as Preferred is given priority over the rest of the pool of resources. However when a Preferred resource is inactive or unavailable, other appropriate resources are selected.
• **Forbidden**: Any resource defined as Forbidden for an activity cannot be assigned to the activity. See the Oracle Field Service Cloud Core Manage Cloud Service User Guide for detailed instructions.

## Create a Filter

You can use filters as a part of the routing process to prioritize resources (or organizations) or activities (or activity groups) above others. First you must create the filter. Then you can add it to a routing plan and configure it for that plan.

The following preference settings are important:

- Select the **Routing** check-box to see the filter on the **Add routing plan** screen.
- Select the **Routing** check-box only for those filters that do not have the filter condition set to **Dynamic**.

### Related Topics

- Add an Activity Filter to a Routing Plan
- Configure an Activity Filter for Routing

## Use the Calendar View

Selecting a different date on the **Routing** screen refreshes the routing runs for the selected bucket.

To use the Calendar view:

1. Click the calendar icon on the Routing screen.
2. Select a date you wish to use.
   
   The routing runs for the selected bucket and child buckets (if any) which are selected in the Resource tree gets updated.
3 Set Up Routing Profiles and Plans

Set Up Routing Profiles and Plans

You can create or modify a custom routing profile or plan.

Routing Plan

Routing plans define the optimization strategies for a company. A company may have several strategies such as:

- a strategy for customer facing activities and employees
- a strategy for internal maintenance activities and employees (if the organizations are managed separately)
- a strategy for morning time, for noon, and for after hours (for example, the morning strategy prioritizes the travel optimization most, noon prioritizes activities that are older then 3 days, after hours works with VIP customers activities, or highest priority problems only)
- a strategy for weekdays
- a strategy for weekends (weekends have a different number of field employees, different service layer agreements, which can be similar to morning but running morning, noon, and after hours)

Routing Profile

A routing profile is a group of all the required routing plans. A routing profile can be assigned to many buckets, so that the customer need not copy the plans for each bucket, and only the plans that are from the assigned profiles are available for the bucket. This ensures that the strategies for different buckets, related to different lines of business or regions are not mixed with other buckets. To run routing on a bucket, you must have a non-empty routing profile assigned to the bucket.

How Access Schedule Impacts Routing

Generally no work is done beyond the hours defined by the Access Schedule. Therefore, routing plans including urgent, immediate, and bulk routing will not schedule activities outside of the Access Schedule. The only exception is when the activity is manually scheduled to be performed beyond Access Hours. In this case, routing may leave the activity service window unchanged.

Multi-day Routing

Some business environments deal with several days of workload. They must be able to understand how many days are required to process the backlog. In addition, the businesses must estimate when each of the activities could be processed, recognize gaps in skills and zones assignments, and manage logistics, such as parts and tools requests. To perform all these tasks, the businesses must be able to route all or majority of the booked activities. This is where the multi-day routing feature helps. As the name suggests, a multi-day routing plan runs for several days. You can create multi-day routing plans that can be started manually, that can be run once a day, or run recurrently. Further, you can roll back a multi-day routing plan as a single activity. The existing plans can be migrated; however, they will be migrated as single-day routing plans and you must change them to multi-day manually. In addition, changing a routing plan from single day to multi-day will not automatically reschedule activities from one day to another. You must select the Allow
rescheduling of activities from one day to another within the routing plan period setting for each activity filter individually.

The benefits of multi-day routing are provided here:

- All the jobs are assigned and constantly reoptimized.
- Important activities are pulled from future to previous days.
- The number of routing plans you must create is reduced.
- You can roll back a multi-day routing plan as a single action.
- You can see a summarized report of routing results including multi-day routing.

Multi-day Routing, Reoptimization and Rescheduling

By default, multi-day routing does not allow reoptimization or rescheduling of activities between days. So, the results of running a multi-day routing run without rescheduling is the same as running single-day runs for the same number of days. However, you can reschedule each activity using a filter in the Filters section. This filter lets only the activities that fit to multi-day rescheduling moved from one day to another during the routing run. However, this restriction doesn't apply to the sequence of routing runs.

If you allow multi-day rescheduling for a particular filter then routing ignores the scheduled date during rescheduling process for given activities. However, all other constraints like SLA and Access Hours will be included.

Routing Screen Widgets and Execution Summary Report

Routing screen widgets display the multi-day routing results. The result of a single multi-day routing run is the same as the result of a series of single-day routing runs, if both runs provide the same resulting routes. The Execution Summary includes the duration for which the routing plan has run. It also displays one entry per run regardless of the number of days in the routing run application period. The date in the entry is the date the plan starts.

The following table describes how these values are calculated:

<table>
<thead>
<tr>
<th>Calculated against total values of the whole run</th>
<th>Calculated against total values of current run, where provider number is (provider * days)</th>
<th>Calculated as a total of daily values</th>
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<td>• Resources used</td>
<td>• Working time optimization savings</td>
</tr>
<tr>
<td>• Average overtime</td>
<td>• Routed activities</td>
<td>• Overtime optimization savings</td>
</tr>
<tr>
<td>• Average travel time</td>
<td>• Resources</td>
<td>• Travel time optimization savings</td>
</tr>
<tr>
<td>• Average downtime</td>
<td>• Activities</td>
<td>• Total savings</td>
</tr>
<tr>
<td>• Resource utilization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Resource Filters

In case of multi-day plans, resource filters are calculated for the period covered by the multi-day plan once and for all. If a resource must be excluded due to plan conditions for at least one day then it is excluded for all the days.
Routing Plans

When you create a routing plan, you fill the **Apply to activities within __ day interval** field. Use this field to create a multi-day routing plan. The number of routing plans in the list of routing plans includes multi-day routing plans as well.

Roll Back

A multi-day routing is rolled back as a single action and rolls back the whole run result. If you click Stop while the plan is running, all the activities routed during this routing run are returned to their initial states. You can roll back routing run results until the last date of the run application period. For example, if you ran a multi-day routing run yesterday for three days, you can roll it back today. In this case, partial rollback is applied, that is, all the Not Started activities are rolled back.

Add a Routing Profile

Routing profiles contain one or more routing plans that run against a bucket.

To add a routing profile:

1. Click **Routing** to open the **Routing** screen.
2. Select **Routing Plans** to display the routing plans and routing profiles available for the selected bucket or resource.
3. Click **Add routing profile** located on the toolbar.
   - The **Add routing profile** dialog displays.
4. Type the name of the routing profile in the **Routing profile name** field.
5. Select the **Active** check box.
6. Click **Add**.
   - The new profile displays in the **Routing Profiles** list.

Clone an Existing Routing Profile

If you want to add a routing profile that is similar to an existing routing profile, you can create a clone. A clone is an exact copy of the existing routing profile. You can change the clone to differentiate it from the existing routing profile.

To clone a routing profile:

1. Navigate to the **Routing Profiles** screen.
2. Find the routing profile that you want to clone in the list.
3. Click **Clone**.
   - The **Clone Routing Profile** dialog is displayed.
4. Type the name of the new profile in the **Routing Profile name** field.
5. Select the **Active** check box.
6. Click **Clone**.
   - The new profile displays in the **Routing Profiles** list.
Modify a Routing Profile

You can modify a routing profile on the Routing Profiles screen.

To modify an existing routing profile:

1. Navigate to the Routing Profiles screen.
2. Find the routing profile that you want to modify in the list.
3. Click the Modify link to display the Modify routing profile dialog.
4. Optionally, modify the Routing profile name.
5. Optionally, select the Active check box to change the status of the profile.
6. Click Update to save your changes.

Activate and Deactivate Routing Profiles

Active routing profiles are used to route activities to resources. Inactive routing profiles are not used. You deactivate a routing profile if you want to save it for future use, but you don’t want to use it right now.

To activate (or deactivate) a routing profile:

1. Navigate to the Routing Profiles screen.
2. Find the row for the routing profile that you want to activate or deactivate and click Modify.
   The Modify routing profile dialog displays.
3. Select or clear the Active check box to activate or deactivate the profile respectively.
4. Click Update.

Set Up Routing Plans

Routing plans provide the rules that are used to route activities to resources. The rules are based on the business goals of your organization. Routing plans are assigned to routing profiles. Routing profiles are assigned to the buckets that you run the routing plan against.

Assign a Selected Routing Plan to a Routing Profile

Routing profiles are used to group more than one routing plan together so that you can run them all against the same bucket.

You can assign several routing plans to a routing profile so that you have plans available to run against a bucket.

Be cautious when running more than one plan against a bucket to avoid conflict between plans for shared resources and activities. When plans conflict with each other or try to use the same resources and activities, the routing results are typically less than optimal.
For best results:

- Use caution when running multiple routing plans against the same resources. Second and later generation routing plans will yield less successful results because they run against the resources remaining from the previous runs.
- Do run the same resources through multiple plans that run against the same bucket, but do so with caution. For example, run one routing plan against the bucket in the evening to assign most of the activities for the day. Then run a second routing plan against the bucket around mid-morning. This second run might find openings for some of the activities that were not assigned in the first run. It can also assign the activities that came in after the first run.
- Do use the fewest number of routing plans necessary. Doing so can minimize the chances of accidental sharing of resources and activities across plans.
- Do run routing plans against large sets of resources and activities. When the pool of resources and activities is small, the application has fewer options for making a good match. As a result, routes will be less optimal and more activities will be unassigned.

Create a Routing Plan

Routing plans provide the rules to use when deciding how to route activities to resources. When you create a new routing plan, you select the routing profile to assign it to in the first step.

You must create a Routing Profile before creating a routing plan.

To create a routing plan:

1. Navigate to the Routing Profiles screen.
2. Find the routing profile to which you want to add the routing plan.
3. Click Add routing plan in the Actions column.
   A new routing plan template displays.
4. Expand each section and add values as necessary.
5. Click Add.
   Before you can run a routing plan against a bucket, you must assign the routing profile that contains the routing plan to the bucket.

Related Topics

- Add a Routing Profile
- Assign a Routing Profile to a Bucket

Clone an Existing Routing Plan

If you want to add a routing plan that is similar to an existing routing plan, you can create a clone. A clone is an exact copy of the existing routing plan. After you create the clone, you can change it to differentiate from the original routing plan.

To clone a routing plan:

1. Navigate to the Routing Profiles screen.
2. Find the routing plan that you want to clone.
3. In the Actions column, click **Clone**.
   The plan that you want to clone displays.
4. Change the values as necessary.
5. Click **Clone**.

Before you can run a routing plan against a bucket, you must assign the routing profile that contains the routing plan to the bucket.

**Related Topics**
- Assign a Routing Profile to a Bucket
- Configure the Routing Plan Section of a Routing Plan
- Configure the Run Schedule for the Routing Plan

## Modify a Routing Plan

You can modify a routing plan from the **Routing Profiles** screen. Before you can run a routing plan against a bucket, you must assign the routing profile that contains the routing plan to the bucket.

To modify an existing routing plan:

1. Navigate to the **Routing Profiles** screen.
2. Find the routing plan that you want to modify.
3. Click the **Modify** link in the **Actions** column.
   The Edit routing plan screen displays.
4. Expand the sections and change the values as necessary.
5. Click **Update** to save your changes.

**Related Topics**
- Assign a Routing Profile to a Bucket
- Configure the Routing Plan Section of a Routing Plan
- Configure the Run Schedule for the Routing Plan

## Activate and Deactivate Routing Plans

Active routing plans are used to route activities to resources. Inactive routing plans are not used. You might decide to deactivate a routing plan if you want to save it for future use, but you don't want to use it right now.

To activate (or deactivate) a routing plan:

1. Navigate to the **Routing Profiles** screen.
2. Locate the row for the routing plan that you want to activate or deactivate and click the **Modify** link in that row.
3. Click **Routing plan** to expand the section.
4. Select or clear the check box next to **Active**.
5. Click **Update**.
Delete a Routing Plan

You can delete a routing plan from the **Routing Profiles** screen.

A Routing plan belonging to a sequence cannot be deleted unless detached from the sequence.

To delete a routing plan:

1. Navigate to the **Routing Profiles** screen.
2. Select the routing plan to delete.
3. Click the **Delete** link in the **Actions** column.
   - A confirmation message displays.
4. Click **Yes** to delete the selected routing plan.

**Related Topics**

- Sequential Routing Plan Configuration

Assign a Routing Profile to a Bucket

You must assign a routing profile to the bucket so that the routing plans in that profile can run against the bucket.

To assign a routing profile to a bucket:

1. Select the bucket that you want to assign the routing profile to from the resource tree.
2. Click **Dispatch**.
3. Select **Routing** from the drop-down menu.
   - The **Routing** screen displays the Execution Summary block by default.
4. Click **Routing Plans**.
   - There are no routing plans in the system message is displayed.
5. Click the **Assign Routing Profile** link.
   - The **Select routing profile** dialog displays.
6. Select the **routing profile** that you want to assign to this bucket from the drop-down list.
7. Click **Update**.

   **Note:** If you select the blank value from the **routing profile** drop-down list and click **Update**, any previous profile assignments for the selected bucket will be removed.

The Routing Plans block shows the routing plan for the selected bucket.
4 Configure a Routing Plan

Overview of Routing Plan Configuration

Routing plans provide the rules to use when deciding how to route activities to resources. After you add or clone a routing plan, you must configure it. This includes defining the run schedule and creating filters that prioritize activities based on a variety of conditions and situational factors. When you configure a routing plan, your choices can have a significant influence on the routing process.

Configure the Routing Plan Section of a Routing Plan

You must provide general details about the routing plan including the profile on which it is based, the routing method and the number of minutes and seconds it will run.

To configure the routing plan section:

1. Click Routing to open the Routing screen.
2. Select Routing Plans to display the routing plans and routing profiles available for the selected bucket or resource.
3. Click the Modify link to open the Edit routing plan screen.
4. Click Routing Plan to expand that section.

5. Identify the routing name and profile and provide other basic details.
   - **Routing plan name**: Enter a name that makes this plan easy to identify.
   - **Routing profile**: Identify the profile to which this routing plan belongs.
Active: Select the check box to make this plan available for routing. You can deactivate a routing plan to avoid running it accidentally. For example, if you have routing plans that you run during certain seasons or other busy times of the year, you can make them inactive until you are ready to use them.

Description: Enter a description for the routing plan. This is an optional field.

6. Click Add.

Tip: If you find that routing is regularly running until the time limit, consider increasing the time limit and monitor the results to see if they are more efficient.

If the Time Limit shows any value between 5 seconds and 20 minutes, the routing plan runs over and over again until it either finds the best match or the time limit expires, whichever comes first.

Configure the Run Schedule for the Routing Plan

The run schedule identifies when you want the plan to run, how often you want to run it, and whether you want to run it over multiple days. You can also specify the day's activities to run the plan against. The run schedule that you choose has an effect on the information you can share with your customers through notifications. For example, if you want to launch a notification the afternoon before an activity, but you don't run routing until the evening, your notification will not include the time slot.

To configure the run schedule for the Routing Plan:

1. Navigate to the Routing Profiles screen and locate the routing plan that you want to configure.
2. In the Actions column, click Modify.
   The Edit Routing Plan screen appears.
3. Expand Run Schedule.
4. Configure one of the following routing plans:
   a. Create a plan to start routing manually:
      i. Select Manually from the Run routing drop-down list.
      ii. Enter a number in the Apply to activities within day interval field. The activities selected for this routing plan are executed within the number of days selected in this field, starting the selected day.
      iii. Select the duration for which the plan must run in the Time limit field.

This figure shows an example of a manual routing plan:
### b. Create a recurring routing plan:

1. Select Recurrent from the Run routing drop-down list.
2. Enter a number in the **Apply to activities within day interval** field. The activities selected for this routing plan are executed within the number of days selected in this field, starting the selected day.
3. Select the start and end time at which the routing plan must run, in the **Start time** and **End time** fields.
4. Enter the interval between each run in the **Interval between runs in minutes** field.
5. Check the boxes corresponding to the days on which the routing plan must run recurrently, in the **Activity days** field.
6. Select the duration for which the plan must run in the **Time limit** field. This time denotes the maximum number of minutes and seconds that the routing plan will run before producing a result. When the application launches a routing plan, it runs the plan over and over again until it either finds the best match or the time limit expires, whichever comes first. Three minutes is usually sufficient. The maximum time limit possible is 20 minutes.

### c. Create a plan that runs once a day:

1. Select once a day from the Run routing drop-down list.
2. The activities selected for this routing plan are executed within the number of days selected in the **Apply to activities within day interval** field, starting the selected day. The default value is 1.
3. The **Start day for activity processing** field is used in the Once a Day and Recurrently plans. New values for Start day for activity processing allow to run routing starting at 2, 3 or 4 weeks in future.

Select one of these values from the drop-down list:

- yesterday
- today
- tomorrow
- +2 days
- +3 days
iv. Enter the time at which the routing plan must run, in the **Time of run** field.

v. The **Activity days** field specifies the days on which activities are scheduled.

vi. Select the duration for which the plan must run in the **Time limit** field. This time denotes the maximum number of minutes and seconds that the routing plan will run before producing a result. When the application launches a routing plan, it runs the plan over and over again until it either finds the best match or the time limit expires, whichever comes first. Three minutes is usually sufficient. The maximum time limit possible is 20 minutes.

This figure shows an example of a plan that runs once a day:

![Run schedule](image)

**d.** Create a plan that runs immediately:

i. Select **Immediately** from the **Run routing** drop-down list.

ii. Select one of the following options:

- **for Urgent Activities**: Activities are assigned and scheduled the same day, regardless of whether this assignment disrupts other scheduled activities. In this case, the SLA is not honored for the activity.

- **activities that correspond with filter**: Only those activities that correspond to the selected filter are assigned immediately. Such activities can also be bundled with other activities that are scheduled for the same location and bucket in the near future.

The figure shows the Run routing field in the Add Routing Plan screen:
iii. Use the **Assignment and Bundling within __ day interval starting** fields to configure bundling activities.

e. Create a plan that runs sequentially after another plan:
   
i. Select Sequentially from the **Run routing** drop-down list.
   
ii. Select the plan that must run before the current plan, from the **after the completion of** drop-down list.
   
iii. Select the duration for which the plan must run in the **Time limit** field. This time denotes the maximum number of minutes and seconds that the routing plan will run before producing a result. When the application launches a routing plan, it runs the plan over and over again until it either finds the best match or the time limit expires, whichever comes first. Three minutes is usually sufficient. The maximum time limit possible is 20 minutes.

5. Use Street Level Routing (SLR) to obtain travel data in your routing plan:

   This feature can be used with routing runs that run Manually, Once a Day, Recurrently and Sequentially; it is not available for Immediate routing runs.

   The Run schedule section shows the **Use SLR to obtain travel data** check box. This indicates that the time limit includes extra time for SLR data.

   a. Select the **Use SLR to obtain travel data** check box.

   b. Select the duration in the **Time limit** field to adjust the time limit accordingly.

   The routing run time includes both gathering SLR data and using that data to run Routing.

   In some situations when there are a large number of pending activities, every point to point travel combination cannot be obtained in the allotted time period. When this occurs, routing will use SLR data and learning travel data to optimize the routes. This ensures routes are optimized quickly with the optimal combination of travel data.

   The figure shows the Run schedule section in the Add Routing Plan screen:
Note: SLR in Routing requires a subscription to Oracle Field Service Cloud Enterprise and Oracle Field Service Standard Map Cloud Service with Google Maps or Oracle Field Service Standard Map Cloud Service with Baidu Maps.

6. Click Add to save your changes.

Note: In some cases, when routing’s evaluation has to terminate due to time limit, it consumes slightly more time than configured. This is because termination cannot occur at the arbitrary point; it occurs only after the completion of the current block of computations.

Restriction of Activities Routed Through Immediate Routing Plan

You can now restrict activities routed through a particular Immediate Routing plan. This is useful to avoid any confusion in technicians’ routes or in case if the you want to bulk route all the activities created in late hours through a nightly routing plan.

To restrict activities routing through a particular Immediate routing plan, enter values in the Start time and End time fields as needed and save the Immediate routing plan.

After Start time and/or End time fields are filled, no activities will be routed before Start time and after End time.

- If both Start time and End time fields do not show any values in the Immediate routing plan by default, there are no restrictions; activities are routed through Immediate routing plan 24 x 7.
- If only Start time field is populated, End time is considered to be equal to midnight (or time set by Overnight settings section in the Business rules screen).
- If only End time field is populated, Start time is considered to be equal to midnight (or time set by Overnight settings section in the Business rules screen).

Note: Scheduled Immediate routing plan routes those activities that were created after End time and before Start time and not routed during this period by another routing plan, after the Start time.
Segmentable Activities Assignment Using Bulk Routing

You can now route segmentable activities using Bulk Routing. Whether you route the segmentable activity from the bucket using Immediate Routing or Bulk Routing, the assignment rules are the same; the routing plan (Immediate or Bulk Routing) either assigns the whole activity to a single resource or leaves it in the bucket.

Note: Earlier, you could assign segmentable activities to a resource either using manual move or through Immediate Routing.

Both Immediate and Bulk Routing observe these rules for segmentable activities:

- Work zones—the resource's work zone must match the work zone of the activity
- Work skills—the resource's work skills must match the work skills required by the activity
- Resource preference—routing should assign the activity to preferred resources or only to required resources, if specified
- Service window—routing should observe the activity service window for all the segments
- Access hours—routing should observe the activity access hours for all the segments
- SLA start—the SLA start of the activity observed for the first segment
- SLA end—the SLA end of the activity observed for the last segment
- Minimum segment duration for a single day <> minutes—indicates that those segments having lesser than minimal duration are not created
- Maximum segment duration for a single day <> minutes—indicates that the total daily amount of segments cannot exceed the configured value. (with the exception for the days containing the last segment of activity, which can exceed the configured amount but the remainder cannot be more than the minimum segment duration)

However, during the initial activity assignment, Immediate Routing optimizes only start/finish time of the segmentable activity. Bulk routing also tries to optimize travel time to and from each activity segment and overtime, overdue and other parameters of the segment the same way as they are optimized for single-day activities.

Control Resource Overtime Through a Routing Plan

Overtime is calculated differently by each organization. Therefore, the Oracle Field Service Cloud Routing Cloud Service module does not calculate overtime as an absolute dollar value, but instead calculates it as time beyond a resource's assigned work schedule that might be required to fulfill an activity.

Using the Resource overtime options within the routing plan enables you to determine how activities that might extend past the end of the resource's shift are handled.

The following figure shows the Resource overtime settings:
Choose from the following options:

- **Assign activities even if the assignment causes overtime:** This option provides the best chance of getting many activities assigned, though some may extend past the end of a shift.

  For best results, do not use this setting if you have significantly more work than resources can complete in a regular workday. If you run routing, results will include a large amount of overtime. This setting is most useful for certain types of work where you are willing to incur the additional cost, for example VIP work.

- **Do not assign overtime activities and leave them in the bucket:** This means that any jobs that have service windows and/or predicted durations that could push a resource into overtime are left in the bucket.

- **Do not assign activities with more than _____ minutes overtime:** This enables you to control the amount of overtime allowed, essentially extending a shift in order to accommodate more work assignments.

- **Do not assign activities unlikely to be finished in ____ minutes before end of resource's day:** This also limits the possibility of overtime, but with the consideration of whether a resource needs additional time (return to depot, drive home, etc.) before the end of their shift.

  **Note:** If you use restrictive overtime settings, fewer good matches might be found and more activities could be left in the bucket to be routed manually.

### Control Travel Time Through the Routing Plan

Routing has been improved by better utilizing point-to-point SLR travel distances and timings along with travel statistics. Subscribers of Oracle Field Service Cloud Enterprise Cloud Service have the option to limit the travel time for a resource to reach an activity.

You can control travel time through the Routing Plan. With improved Travel time section of the routing plan settings, you can add the option to choose the optimization type and set distance limits.

**To control Travel time**

1. Open the Routing Plan. Scroll down to display the **Travel time** settings.

   The following figure shows the **Travel time** settings on the Routing plan screen.
2. Choose either time or distance depending the routing plan settings as follows:
   - **Prefer fastest routes, even if it means the increase of a total travel distance**—Indicates that activities might require lengthy travel but the total travel time for the entire bucket is optimal. This option is the default option and results in the most optimized routes.
   - **Prefer shortest routes, even if it means the increase of a total travel time**—Indicates that activities might require a longer travel time but the total distance travelled will be optimal.

   You can minimize summary travel if some specific activities are getting long travel or some activities are left unassigned and summary travel may be increased. This enables you to limit the amount of travel time or distance a resource can spend travelling for any one activity. This results in fewer assigned activities and less optimal routes, but eliminates any travel that is beyond the specified amount of time or distance.

3. Check the following fields and enter the time limit in minutes and the distance limit in miles:
   - **Avoid travel longer than __ minutes**
   - **Avoid travel longer than __ miles**

### Set the SLR Time Limit

You can now choose separate time limits for Routing and SLR.

Use these steps to choose the time limit for SLR.

1. Scroll down to the Travel Time section.
2. Enable the **Use SLR** check box and select a value from the **SLR time limit** drop-down list.

   Do not choose SLR Time Limit to be more than or equal to the Routing time limit for the following reasons:
   - Routing time limit defines the time frame within which the whole routing plan should finish.
   - SLR time limit defines which part of this time can be used for SLR-related tasks, allowing you to fine tune routing performance.
Note: If you use SLR functionality in Routing, you should subscribe to the corresponding SKU.

3. For those plans having Use SLR check box enabled, SLR time limit field is populated based on the value in the Routing time limit field during migration using these rules:
   - 5 seconds 5 seconds
   - 10 seconds 5 seconds
   - 15 seconds 10 seconds
   - 30 seconds 15 seconds
   - 1 minute 30 seconds
   - 2 minutes 1 minute
   - 3 minutes 2 minutes
   - 5 minutes 3 minutes
   - 10 minutes 5 minutes
   - 15 minutes 10 minutes
   - 20 minutes 15 minutes
   - 40 minutes 20 minutes
   - 60 minutes 40 minutes

4. Here are some examples:
   - If you choose the Total routing time limit to be 5 minutes and SLR time limit as 3 minutes, you should expect the overall routing result in about 5 minutes, the SLR module uses up to 3 minutes and routing engine uses the remaining time.
   - If you choose the Total routing time limit to be 60 minutes and SLR time limit as 40 minutes, you should expect the overall result after an hour, from which time the SLR module uses up to 40 minutes.

Compatibility Parameters

You can view displays those parameters that are not deprecated but not recommended to use in the Compatibility Parameters section.

These parameters are not recommended to use:

- Try to schedule activities to service window start parameter is not recommended for use. Alternatively, you can select the Override default service window reservation check box under the Compatibility Parameters section and set the Service window reservation, % value as 100%.
- Use Dynamic Routing parameter is not recommended for use. You can achieve similar results by just limiting the number of visible activities in the route for Technicians. However, if you must set this parameter, you can enable the relevant check box under the Compatibility Parameters.
Sequential Routing Run

Oracle Field Service Routing Cloud Service allows you to configure the Routing plans that run automatically in a strict finish-to-start sequence. Such sequential assignment may be quite important in certain business environments where some activities must be assigned only after a different category of activities has been assigned.

Configuring several Routing plans to run at specified times so that the routing plans follow each other may be a solution. However, this solution is not too reliable. Depending on the number of activities in the bucket, a Routing run may take longer or shorter than estimated which may either create unproductive gaps in the Routing operation or even ruin the sequence. Sequential Routing run has become the optimal solution for this challenge. Two or more Routing plans are configured to start one after the other. The sequence is automatic, thus, any unusually long or short Routing runs will not affect it.

The Routing plan configuration window now has an additional Run Routing option – sequentially. When it is selected, the Routing Run window changes to include the field where the preceding Routing plan is to be chosen. For sequential Routing plans, the selection of a predecessor is mandatory; so, at least one Routing plan has to be created priorly.

Sequential Routing Plan Configuration

The configuration of a sequential Routing run always includes selection of a predecessor Routing plan, that is, the one to be completed before the current one starts. Any Routing plan, regardless of its schedule, can be selected as predecessor. However, any Routing plan can have only one successor, therefore, whenever a sequence has already been created, the predecessor Routing plan of such sequence can no longer be selected for other sequences. Its name is disabled in the list.

The following figure shows the settings for a sequential routing plan:
Sequential Routing plans can be used as predecessors creating longer sequences, if the business needs so require. Other routing plan settings depend on the company specifics and are not influenced by the sequential nature of the Routing plan.

Note: Routing plan sequences can only be created within one routing profile. Sequences of Routing plans between different Routing profiles are not supported. The Routing plan summary shown in the Routing plan header contains its schedule – Sequentially after [predecessor_Routing_plan_name].

A Routing plan belonging to a sequence cannot be deleted unless detached from the sequence. On an attempt to delete such Routing plan, the action is rejected with the [Routing_plan_name] is already in use and cannot be deleted error message. To detach a Routing plan, change the schedule from sequentially to any other, starting from the last plan in the sequence. This restriction applies to all plans in a sequence regardless of their position. The system prevents creation of Routing plan chains forming closed loops in which the first plan is to be started after the completion of the last one. If the first Routing plan in the sequence is changed to the sequential schedule to start after the completion of the last plan in the same sequence, the modification is rejected with the Routing plan {plan_name} cannot be processed error message.

Sequential Routing Plan Execution

A sequence of Routing plans is started with the start of the first Routing plan. The first plan is started according to its schedule settings – automatically (timed), manually or immediately after a certain activity appears in the bucket. After its completion the second Routing plan starts automatically followed by the subsequent Routing plans, if any.

The Routing widget on the Activities screen shows the first Routing plan in the sequence with an icon appropriate to its schedule. The subsequent Routing plans are marked with the 'chain' icon meaning that the plan is part of a sequence. When the first Routing plan in the sequence is started, the user if offered two options – to run only the current Routing plan or the entire sequence. If the user chooses to run only the current Routing plan, it will be executed as any other Routing plan. If the user chooses to run the whole sequence, the completion of the first Routing plan will automatically trigger the second plan, and so on. Sequential Routing plan runs are identified on the Routing screen by the 'chain' icon in the Initiated column and the runs after [predecessor_Routing_plan_name] note in the Routing Plan column.

Any Routing plan belonging to a sequence can be rolled back without influencing other plans in the same sequence. Activities assigned or not assigned as the result of other plans in the sequence will remain in their places. A deactivated Routing plan is skipped in the sequential Routing run. Other plans in the sequence start according to their settings.

Related Topics
- Video: Create a sequential routing plan

Immediate Activity Assignment

The Routing module can now prioritize activities and assign urgent ones to technicians immediately, even if it is at the cost of other activities. If the priority of the new activity is high enough, Routing can rearrange technicians’ routes and insert urgent activities in front of other activities. This rearrangement happens even when the technician is already on the way to an activity or in the middle of an activity.
Oracle Field Service Cloud Routing Cloud Service automatically assigns activities created in the bucket to resources matching the requirements of such activities. Depending on your company requirements, you can select a routing schedule that is the most suitable for a particular bucket. Routing can be started manually or once a day or recurrently with the specified interval. These options covered most of the operational patterns used by different companies. If the company preferred to distribute the workload the day before and provide its technicians with complete routes at the beginning of their working day, then once-a-day Routing is the best option. If the company has to respond quickly to new tasks received during the day, then recurrent Routing running several times a day is the solution.

The demand for a solution designed to handle urgent activities has called for a further enhancement of the Routing schedule options. The Routing module is now able to assign activities meeting certain criteria immediately after they are created in or moved to the bucket. This way, the time between the activity creation and its assignment is minimal. Routing now has one more schedule option, immediate. Depending on the schedule settings, Routing either assigns urgent activities identified by the activity priority or assigns certain activities from the bucket keeping the time till assignment to the minimum.

Urgent and immediate activities with SLA end that have a preferred resource are assigned to preferred resources. If a preferred resource has the work day start after SLA end time and other resources are available to execute this activity, then the activity is assigned to the other resource. Further, if a preferred resource is not available for an urgent activity assignment, the activity will be assigned to another resource with the matching work skills (and work zone based on the routing plan configuration).

Urgent routing doesn’t assign activities to those technicians who just have on-call working calendars but their route is not activated. Urgent routing assigns activities to those technicians who have on-call working calendars and their route is activated.

Basic Principles of Immediate Activity Assignment

Immediate-assignment functionality is aimed at assigning certain activities immediately following their creation in or moving to the bucket. It serves the following purposes:

- Assignment of activities with the minimum ETA possible. The activities to be assigned are determined by the Activity Priority settings.
- Assignment of activities within the configured interval. The activities to be assigned are determined by applying a filter.
- Support segmentable activity assignment when the Activity Type = segmentable activity flag is set.

Note: Segmentable activities are not supported by urgent routing plans.

- Segmentable activities are available for Immediate Routing when you create them and when you move them to the bucket.
- Immediate routing of segmentable activities will use the required work skill ratio and not the preferred work skill ratio. This is different from regular activities.

Immediate Routing may not route those activities that are linked with hard constraints if they are assigned to the Bucket and linked before Immediate Routing triggers and starts the processing of such new Activities. Activities linked with other constraints will be routed via Immediate routing without any issues.

Start-start and finish-finish are considered hard constraints as one linked activity is assigned to a resource while another linked activity is in the bucket; this violates the constraint for an assigned activity.

Immediate Routing may still assign one of the linked activities (say activity A) in case if:

- Activities linked to A are assigned to the field resource
• Activity A is assigned in such a way that its links will not be violated (apart from other Routing's conditions).

Note: Assigning simultaneous links is not supported via Immediate Routing; such activities are skipped and left unassigned.

Resource Filters in Immediate and Urgent Routing
Immediate and urgent routing plans contain resource filters similar to Bulk Routing plans. The Filters section is similar to the Bulk Routing with the following exceptions.

To set resource filters:

1. Navigate to the Routing screen.
2. In the row for the Immediate or urgent routing plan, click the Properties icon and select Modify.
3. In the Edit Routing Plan screen for Urgent and Immediate routing plan, expand the Filters section, set the filters as needed. The Filters section is similar to the Bulk Routing with the following exceptions:
   - Only one predefined filter is available for non-scheduled activities in the routing bucket
   - You cannot add other filters or delete existing filters
   - You cannot add/modify/delete activity filters

Activity Priority

Activity priority used by Routing to assign urgent activities is defined for the whole company as one of the Business Rules settings.

By setting the activity priority the company defines the activity property and its values which will make the activity urgent. For example, the company must always perform repairs as soon as possible to reduce service disruptions to the minimum. In this case the company may select Activity Type as the property and Repair as its value to consider an activity urgent. Only one activity property can be used to identify urgent activities. Several values of the same property can be used as criteria of activity urgency. In this case the values must be separated by commas or carriage returns (new lines) in the Urgent activities have the following values of the property field. Values in the Normal activities have the following values of the property field define the values for the Activity Type field, to consider an activity as normal.

The following figure shows the Activity priority section of the Business Rules screen:

Note: The order of property values defines the priority level. The value listed first will have the highest priority, with other values following in the descending order.
Priority activity ETA does not include SLA, it includes the service window. This may result in SLA violation. In priority activities, such SLA violations are considered to be expected behavior. However, SLA is included for all rest activities.

Routing Plan Settings

To assign urgent activities, you must create a special Routing plan.

ETA calculation for priority and normal activities include:

1. On applying of routing output application moves activities to corresponding resources in accordance with order which is returned in the output.
2. Priority activity ETA calculation takes into account service window (as it is the time agreed with final customer), but not SLA. This can result in SLA violation. In case of priority activities such SLA violation is expected behavior. At the same time, SLA is taken into account for the rest activities.

The Run schedule field now has the immediately option, which is used to assign the activities meeting the defined criteria as they appear in the bucket.

Once immediately is selected, two options of activity selection appear. Here the user has to choose the group of activities to be assigned immediately. The following options are available:

- for Urgent Activities (Routing will assign the activities matching the 'property+value' combination defined in the Activity Priority field)
- for activities that correspond with {filter_name} filter (Routing will assign the activities matching the selected activity filter)

The option assigning activities matching a filter can be useful when certain categories of activities have to be assigned as soon as possible, so that the time between the customer's order and the assignment confirmation is reduced to a minimum. Also, it may be necessary to quickly estimate the remaining available time in a bucket. The main goal is to assign all activities, even if such assignment results in sub-optimal routes. Routes can be reoptimized in subsequent Routing runs. All activities not matching the defined criteria will remain in the bucket until the next Routing run is scheduled according to a different Routing plan.

Urgent activities must be assigned as soon as possible, therefore, other factors, such as resource overtime, cost of assignment or non-assignment, route optimization and reoptimization, etc. are ignored. When immediately is selected as the Routing mode, sections containing other settings (Assignment Parameters, Filters, Reoptimization, Resource Overtime, and Travel Time) are hidden as irrelevant.
**Note:** Only one routing plan intended to assign Urgent Activities can be created per Routing profile. Multiple Routing plans intended to assign urgent activities may interfere with each other. As soon as one Routing plan is created, the **for Urgent Activities** option becomes inactive for subsequent Routing plans. For the same reason, the Clone option is not available for a Routing plan configured for assignment of urgent activities.

### Assignment of Urgent Activities

When the routing plan is set to **Urgent activities**, Routing refers to the Business Rules settings defining the urgent activity properties.

If an activity created in or moved to the bucket matches the urgent activity parameters Routing will assign it immediately to the most appropriate resource, even if such assignment violates SLA's of other activities in the resource's route. Urgent activity assignment observes the following constraints:

- **Work zone**—the resource's work zone must match that of the activity.
- **Work skills**—the resource's work skills must match the work skills required by the activity.
- **Resource preference**—the activity may be assigned only to those resources that meet the required or preferred resource preferences, if specified.
- **Service window**—the activity service window must be observed.
- **SLA end**—the SLA end of the activity must be observed. Activities with expired SLA will not be routed using Immediate Routing.
- **Working Calendar:** the resource must have a working calendar to be considered for assignment.

#### Selection of Resource for Urgent Activity Assignment

Since the principal objective of urgent activity assignment is to reduce its ETA to the minimum, it is important to assign it to the resource, which is the closest to the activity site, so that the travel time is the shortest. Depending on their priority (the priority property value) urgent activities can be placed at different points in the route:

- At the beginning of the route
- After a started or completed activity
- After a pending activity

The position in route which the urgent activity is to take defines the method of determining the resource location. The following cases are possible:

- **The urgent activity is to be placed at the beginning of the route:**
  - If the resource has GPS coordinates newer than 20 minutes ago, the GPS coordinates are used.
  - If no GPS coordinates are available or if GPS coordinates are older than 20 minutes, the resource's Start Location is used.
  - If no GPS coordinates are available or if GPS coordinates are older than 20 minutes and no Start Location is assigned to the resource able to ensure the minimum ETA from among those matching the activity requirements, the resource's location is undefined, thus such a position is not suitable for urgent activity assignment.

- **The urgent activity is to be placed after a started or completed activity:**
  - If the resource's GPS coordinates are newer than the address of the started or completed activity, the GPS coordinates are used.
If no GPS coordinates are available or if GPS coordinates are older than the address of the started or completed activity, the address of the started or completed activity is used.

- The urgent activity is to be placed after a pending activity:
  - The address of the pending activity is used.

Urgent activities may be assigned to a resource already traveling to a different activity or even in the process of performing a different activity. In this case the urgent activity still has priority, and the resource either has to change direction or interrupt another activity. Any activities for which a different property value is set are not considered urgent and will be assigned in the usual manner.

### Assignment of Non-Urgent Activities

When choosing the **for activities that correspond with {filter}** option, you must select that filter based on which Routing will identify activities to assign immediately.

The drop-down list contains all activity filters applicable for routing which have been created on the **Filters** screen. When you create an activity matching the selected filter in the bucket, Routing immediately assigns it to an appropriate resource. However, unlike urgent activities, Routing assigns a non-urgent activity to an available time slot (no constraints of other activities will be violated) and only when it causes no overtime to the resource. A Routing profile may contain several routing plans designed to assign non-urgent activities immediately. Such plans may be based on different activity filters, so that activities meeting the criteria of several filters are assigned immediately after creation.

If the **All** option is selected from the filter list, all activities appearing in the bucket will be assigned immediately.

Non-urgent activity assignment observes the following constraints:

- Work zone—the resource's work zone must match that of the activity.
- Work skills—the resource's work skills must match the work skills required by the activity.
- Resource preference—the activity may be assigned only to required or preferred resources, if specified.
- Service window—the activity service window should be observed. Note that schedule date is not observed thus, activity may be scheduled to any date up to 14 days from now.
- SLA start—the SLA start of the activity should be observed.
- SLA end—the SLA end of the activity should be observed.

**Note:** Immediate routing supports segmentable activities only if they are non-urgent activities.

When Routing is set to assign non-urgent activities, it does not perform route optimization. The goal is to assign all activities as soon as possible. The next scheduled routing run may reoptimize the routes created as the result of immediate assignment according to its settings.

### Bundling of Activities

You can bundle activities (in immediate or bulk routing) with other activities that are scheduled for the same location and bucket in the near future.
For more details about bundling of activities, see these sections:

- Bundling of Activities in Immediate Routing
- Bundling of Activities in Bulk Routing
- Bundling Conditions
- Order of Activities in Bundles
- Bundling Urgent Activities
- Bundling Non-urgent Activities

## Bundling of Activities in Immediate Routing

Immediate activity assignment may result in certain additional costs related to the violation of other activity SLA or the resource’s travel to a different location. To compensate for such additional costs, sometimes it is reasonable to combine the urgent activity with other activities that are located in the same place. Another situation is when the urgent activity requires admission to a restricted area. In this case, the company may assign other activities in the same facility to the same resource and request access only once. Such assignment type is called bundling.

Routing determines which activities may be bundled together by the same criteria that are used in creation of visits. For example, if activity asset (which, depends on activity type, may be translated to activity address or equipment id or area code) is used as a visit bundling key then the activity asset will also be considered in the assignment of urgent activities, and, should any activities be found on the same asset as the urgent one, such activities will be bundled that is, assigned together to the same resource, same day and one immediately after the other.

## Bundling of Activities in Bulk Routing

Bulk routing also uses visits bundling key and address (i.e. address, city, state, zip/post code and country) to determine which activities can be performed as a bundle. This provides improved optimization due to time saved on travel and other operations.

To define activities that (are already scheduled in the future and) are eligible to be moved to form a bundle, select these options:

- **Enable moving activities between providers** to bundle activities from different routes
- **Enable moving activities from one day to another during routing plan period** to bundle activities scheduled to different days.

Bundling in Bulk Routing is a soft rule enforced with each routing run. If a lesser cost-fit method is available or if it is more optimal to perform two or more activities by two or more resources, you can assign multiple resources instead of creating a bundle; the Enable moving activities between resources routes check box is enabled.

## Bundling Conditions

The application uses these conditions to determine the activities which activities can be bundled together:

- activities must be in the **Pending** status
- activities must have the same bundling key (for Immediate Routing)
- activities must have the same bundling key or the same address (for Bulk Routing)
- activities must be within the defined interval of dates (for Immediate Routing, see below)
- non-scheduled activities must have an empty SLA start value or a SLA start value within the defined interval of dates (for Immediate Routing, see below)
When the application finds the acceptable destination route, it checks these assignment constraints for all activities in the bundle:

- work zones—the resource's work zone must match that of the activity
- work skills—the resource's work skills must match the work skills required by the activity
- Resource preference—the activity may be assigned only to required or preferred resources, if specified
- Service window—the activity service window should be observed
- Access hours – the activity access hours should be observed
- SLA start—the SLA start of the activity should be observed
- SLA end—the SLA end of the activity should be observed
- Maximum duration if a single bundle— 8 hours

Order of Activities in Bundles

When a bundle is formed, the sequence of activities within is determined according to the constraints:

1. activity link constraints
2. activity priority
3. service window end
4. service window start
5. SLA end
6. SLA start
7. activity ID

All bundled activities are analyzed for constraints in the order stated previously. If no activities belong to any links, the activity priority, if any, determines the sequence. If no priorities are set for the bundled activities, the activities with the earliest service window end will be placed first, and so on.

Bundling Urgent Activities

When activities are bundled to an urgent activity (the one with the priority defined in the Business Rules screen), the urgent activity is assigned first. When the destination route has been found for the urgent activity, other activities are analyzed to find whether the route can be joined with the urgent activity. While creating a Routing plan for immediate activity assignment, the user can define the period within which Routing has to search for activities to bundle with the urgent one. For that purpose, the Run schedule settings include the Bundling within [ ] day interval field.

The Bundling within [ ] day interval field defines the period within which Routing has to search for activities to bundle with the urgent one. The interval can be set in the range between 1 and 99 days. If no activities matching the bundling criteria are found within the bundling range, no bundles are created.

Bundling Non-urgent Activities

When non-urgent activities are to be assigned immediately, the system checks if any activities in the already existing routes have the same bundling keys. Upon finding such routes, the system checks other assignment constraints and assigns a non-urgent activity only if all assignment constraints are satisfied. A non-urgent activity will be assigned to the route containing the largest number of activities with the same bundling key or to the route with the earliest date. If no such route has been found, the non-urgent activity is assigned to the first acceptable route with no bundling. The bundling date range is defined as part of the Routing plan settings.

The following assignment and bundling settings can be made:
Assignment and Bundling within [ ] day interval starting [ ] – the start and duration of the period within which the application has to assign scheduled activities and create bundles with the already assigned ones. The bundling interval can be set in the range between 1 and 99 days. Assignment and bundling of activities will start on the selected day and continue for the defined duration of the interval. For example, if the following settings have been made: Assignment and Bundling within 10 day interval starting Today +2, the application searches for activities matching the visit bundling keys two days from today and continue for 10 days. Non-urgent activities will be assigned to form bundles with the found activities within the same period. If no bundles can be formed, non-urgent activities will be assigned to routes within the same period.

Immediate Routing Plan Execution

Immediate Routing Plan is triggered by the creation of an urgent activity or an activity matching the filter in the bucket. If activity is not routed immediately after it is placed in the bucket (due to lack of resources or not matching the filter), Immediate Routing Plan may be re-triggered periodically and also by any activity property change. Immediate Routing plans can never be started manually and, therefore, have no Run link in the list of Routing plans for a bucket.

The results of an immediate Routing run include the following data:

- If the plan was set to assign Urgent Activities:
  - Assigned activities – the number of successfully assigned urgent activities
  - Bundled activities – the number of other activities joint with the urgent ones
- If the plan was set to assign non-urgent activities matching the selected filter:
  - Assigned activities – the number of activities assigned without creating bundles
  - Assigned with bundling activities – the number of activities matching the selected filter assigned in bundles
  - Bundled activities – the number of activities from the bucket or non-scheduled pool joined with the filtered activities to create bundles

Related Topics
- Video: Assign activities immediately

Assignment and Fallback Options for Activity Broadcasting

The Assignment and Fallback section is displayed when you create a routing profile with the option ,immediately from the Run routing drop-down list.

Note: You must enable the Collaboration service to view the Assignment and Fallback section. View the About screen to verify whether the service is enabled.

The Assignment and Fallback section is used to configure the following settings:

- To trigger activity broadcasting to multiple users, use one of the following options:
  - Automatic: Assigns activity directly to matching resources in the bucket.
Use Assignment Parameters to Fine-Tune the Routing Plan

Set Assignment Parameters to further configure the routing process.

To set assignment parameters:

1. Navigate to the **Routing** screen and locate the routing plan to which you want to configure.
2. Click **Actions** and select **Modify** to open the **Edit Routing Plan** screen.
3. Expand the **Assignment Parameters** section.
4. Select the following options, as necessary:

   - **Enable Routing by Inventory**: When this check box is selected, routing takes into account required inventories for all activities that are sent to routing, and assigns activities only to resources that can meet these requirements. This could result in some activities left unassigned. Activities which have no inventory requirements are not affected by this setting. They will be routed in the same way as before. Activities will be left unassigned if there are no resources which meet their inventory requirements. Such activities will be rejected with reason code: 6003 and message: no appropriate resources. Regular activity filters and resource filters, work zone, work skill restrictions apply as usual. For example if a resource which has the inventory X is not selected by filter for the activity that requires inventory X, then that activity will not be assigned to that resource.

   - **Dynamic Routing**: enables you to set limits on how long the module will run based on the number of minutes and/or the number of activities routed. The image (below) shows a different location for setting minutes/activities (described as the Dynamic Routing check box of the Add/Edit routing plan dialog):
○ **Limit work by points:** Check the box to enable Routing to limit how many activities technicians can have in their routes. Note the following:
  - Overload by points may still happen if an activity was added to the route or updated after routing was performed.
  - Routing will not remove previously-assigned activities back to bucket nor assign to another resource if a route was already overloaded before the Routing run.
  - Zero points activities may be assigned to any resource, including but not limited to, resources with already overloaded routes and resources that have zero or negative points capacity.

○ **Try to schedule activities to service window start:** This option (formerly named Route Uniformity) schedules activities as close to the start of service windows as possible. As a result, routing options will typically include a broader selection of resources and the possibility of burdening some resources with many activities and under-utilizing others is minimized. Note, however, the following consequences are there:
  - Idle time may collect closer to the end of the service window.
  - Summary travel time may increase.
  - Summary work time may increase.

○ **Override default service window reservation value:** This check-box enables modification of service window reservation. Default Service window reservation is up to 20% of the service window but no more than 60 minutes. See ‘Service window reservation %’ description for more details.

○ **Service window reservation %:** This field determines the percentage of the service window from its end that must be reserved. Routing will try to avoid assign activities with ETA within the reserved part of their service windows by pushing the activities to an earlier ETA. Routing will try hard to push the activity to an earlier ETA as higher is the late arrival penalty for this activity. This setting applies to all the activities that are part of the routing plan.

For example, an activity has a service window from 10:00 AM to 5:00 PM:
  - If 15% is specified in the **Service window reservation %** field, the last 63 minutes of this 420 minutes service window are reserved.
  - If 50% is specified in the **Service window reservation %** field, 210 minutes are reserved.

Higher **Service window reservation %** increases the 'buffer time', which may result in degradation of the other metric.

Lower percentage may result in higher risk of resource appears to be late for the appointment.
Note: Service Window Reservation % is not applied (its effective value is 0%) in case of (a) bundling the activities on the same address or (b) having the same bundling key and assigned to same technician for activities starting from second one in the bundle.

- **Center point home zone support:** This option defines the home zone radius, that is, the number of miles in any direction from the starting point and the penalty to be applied if a resource must leave the home zone to complete an activity. The default penalty (Overstep Weight) is 4.
- **Automatic ordering:** This option places activities without service windows on the route in the most efficient order. If cleared, the application places these activities on the route, but does not assign a time slot. In this case, resources decide when to do the work.

Automatic Ordering can help you complete more activities over the course of the day, but it also reduces the resources’ ability to use their own judgement in completing activities.

- **Limit work by points:** This option is only necessary if you use points to estimate activities. It limits the number of activities assigned to a resource based on the maximum points allowed within a resource’s shift. You must also enable Points Support in Business Rules, enable a Points property, and send the point value for the activity through the API.
- **Move activities to the bucket instead of assignment to contractor’s resource:** This option assigns the relevant activities to a contractor’s bucket instead of the contractor’s resource. For this option to work, you must run the plan from an In-house Organization bucket that has contractor buckets (and, possibly, in-house ones) as children. In this case activities routed to in-house technicians will be assigned to technicians, but activities routed to contractor technicians will be assigned to contractor buckets. However, if you run the plan from a contractor bucket, the activities will be assigned to the underlying contractor technicians.

Note: You must assign only new activities to contractor buckets. Do not assign activities to contractor buckets when the optimization goal is selected. If you do so, all the activities that are in the existing Contractor resources’ routes are assigned to the parent bucket. **Move activity to the bucket instead of assignment to contractor’s resource** check-box is available only for Manual, Once a Day, and Recurrent routing plans.

When you close **Assignment Parameters**, you’ll see your selections summarized on screen.

**Related Topics**
- Change the Optimization Goal

**Bulk Routing (High Uniformity) Routing Profile**

The routing plan in the Bulk Routing (High Uniformity) routing profile distributes activities evenly across the entire workforce while still minimizing travel and work costs where possible.

The following table describes the values you must set in the **Routing plan** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routing Plan Name</td>
<td>Uniform – Bulk Routing</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The following table describes the values you must set in the **Routing schedule** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run routing</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You can use any run schedule with this goal. Most companies that use bulk routing run the plan once a day in the evening or early morning.</td>
</tr>
</tbody>
</table>

The following table describes the values you must set in the **Filters** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources link</td>
<td>Activities</td>
<td>*Bulk Routing does not use filters. You can add filters to prioritize certain types of activities or certain resources over others.</td>
</tr>
<tr>
<td>Scheduled</td>
<td>Assignment Cost</td>
<td>Normal</td>
</tr>
</tbody>
</table>

The following table describes the values you must set in the **Filter parameters** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigning Activities which are about to be late</td>
<td>Do not assign &quot;overdue&quot; activities and leave them in the bucket</td>
</tr>
<tr>
<td>Cost of not assigning an activity</td>
<td>Normal - default setting</td>
</tr>
<tr>
<td>Late arrival penalty</td>
<td>Normal - late arrival may result in rescheduling if the customer is no longer at home</td>
</tr>
</tbody>
</table>

The following table describes the values you must set in the **Assignment parameters** section:
### Setting | Value | Explanation
--- | --- | ---
Enable routing by inventory | Check box is cleared | • Routing takes into account required inventories for all activities that are sent to routing. Activities which have no inventory requirements are not affected by this setting.  
• They will be routed in the same way as before. Activities which have inventory requirements can only be assigned to resources which meet all inventory requirements.  
• Activities will be left unassigned if there are no resources which meet their inventory requirements.

Dynamic Routing | Check box is cleared | Dynamic routing enables you to control the number of activities or the amount of time that should be filled on the resources' schedules. Routing plans that use dynamic routing are typically run recurrently throughout the day.

Limit work by points | Check box is cleared | • This option is necessary only if you use points to estimate activities.  
• This option limits the number of activities assigned to a resource based on the maximum points allowed within the shift.  
• The point value for each activity must be sent through the API.

Try to schedule activities to service window start | Check box is selected | This option schedules activities as close to the start of service windows as possible. As a result, the activities are divided evenly across all of the resources in the bucket. Activities are typically more evenly distributed, but routes may be less efficient.

Center point home zone support and Home zone radius | 4 | An optional setting that permits you to specify a radius spans a technician's starting location. Penalties are assessed for assigning activities outside the circle of the defined radius. The further away the activity is, the higher the penalty.

Home zone radius overstep weight | 4 | This option defines the penalty to be applied if the resource leaves the home area to complete the activity. This option is displayed when Center point home zone support is selected.

Automatic Ordering | Check box is selected | This option places activities without service windows on the route in the most efficient order. Checking this option makes routes more efficient, but reduces the resources’ freedom to exercise judgement in completing activities.

The following table describes the values you must set in the **Optimization Strategy** section:

### Setting | Explanation
--- | ---
Optimization Goal | Select the goal from the drop-down list: Reduce overdue, optimize routes, or assign high priority activities.

Filters | Filters compare routing results with the activities in the bucket and reassign activities based on the priorities set in the new filters.
Click **Add filters** to add activities which can be optimized.

Under Activities, select the filter that you want to run against the activities in the bucket. Under Destination for unassigned activities, select the status that you want to assign to activities that are not assigned to routes and are, instead, returned to the bucket.

This table describes the values you must set in the **Resource overtime** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign activities even if the assignment causes overtime</td>
<td>Check box is cleared</td>
</tr>
<tr>
<td>Do not assign &quot;overtime&quot; activities and leave them in the bucket</td>
<td>Check box is selected</td>
</tr>
<tr>
<td><strong>Note</strong>: When you select this option, resources do not receive activities that will extend their workday past their scheduled working hours.</td>
<td></td>
</tr>
<tr>
<td>Do not assign activities with more than __ min. overtime</td>
<td>Check box is cleared</td>
</tr>
<tr>
<td>Do not assign activities that unlikely to be finished in __ min. before end of resource's day</td>
<td>Check box is cleared</td>
</tr>
</tbody>
</table>

This table describes the values you must set in the **Travel time** section:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimize summary travel even if some activities require long travel times.</td>
<td>Check box is selected</td>
</tr>
<tr>
<td><strong>Note</strong>: This option produces routes with optimized travel times for the entire organization, but not necessarily for each individual resource. As a result, a few activities might require long travel times, but the amount of travel for the whole group is optimized.</td>
<td></td>
</tr>
</tbody>
</table>
### Dynamic Routing Profile

The routing plan in the Dynamic Routing (2 Activity/120 min) routes activities frequently. This routing plan is useful when activities are booked shortly before the activity time or when you do not know in advance which resources will be available to accept the activities. Routing results are not as optimal as using bulk routing, but activities are routed closer to their actual activity time.

The following table describes the values you must set in the **Add routing profile** screen to create a dynamic routing profile:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routing Plan Name</td>
<td>2hr in advance - Dynamic Routing</td>
<td>N/A</td>
</tr>
<tr>
<td>Routing Profile</td>
<td>Dynamic Routing (2 Activity / 120 min)</td>
<td>N/A</td>
</tr>
<tr>
<td>Active</td>
<td>Check box is selected</td>
<td>The routing plan must be active before the application can use it to run routing.</td>
</tr>
</tbody>
</table>

The following table describes the values you must set in the **Run schedule** screen to create a dynamic routing profile:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run routing</td>
<td>Recurrent</td>
</tr>
<tr>
<td>Apply to activities within starting</td>
<td>1 day interval (Range of 1 and 99 days)</td>
</tr>
<tr>
<td></td>
<td>Today</td>
</tr>
</tbody>
</table>
### Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start time</td>
<td>6:00</td>
<td></td>
</tr>
<tr>
<td>End time</td>
<td>20:00</td>
<td></td>
</tr>
<tr>
<td>Interval between runs</td>
<td>30 minutes</td>
<td></td>
</tr>
<tr>
<td>Activity days</td>
<td>Mon, Tue, Wed, Thu, Fri</td>
<td></td>
</tr>
<tr>
<td>Time limit</td>
<td>5 minutes</td>
<td></td>
</tr>
</tbody>
</table>

Three minutes is usually sufficient. In some cases, running the plan longer might produce a result that better matches your objectives. When activities are added to the system throughout the day and require a quick turn around, you must run routing plans frequently. Choose the recurrent option and run the plan to Today's activities. Set the interval between runs to a short interval, typically 30-60 minutes is optimal. The following table describes the values you must set in the **Assignment parameters** section to create a dynamic routing profile:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home zone radius overstep weight</td>
<td>4</td>
<td>This option defines the penalty to be applied if the resource leaves the home area to complete the activity. This option displays only when Center point home zone support is checked. The default value is 4.</td>
</tr>
<tr>
<td>Try to schedule activities to service window start</td>
<td>Check box is selected</td>
<td>This option schedules activities as close to the start of service windows as possible. As a result, the activities are divided evenly across all of the resources in the bucket. Activities are typically more evenly distributed, but routes might be less efficient.</td>
</tr>
<tr>
<td>Automatic Ordering</td>
<td>Check box is selected</td>
<td>This option places activities without service windows on the route in the most efficient order. Checking this option makes routes more efficient, but reduces the resources' freedom to complete activities when they want to.</td>
</tr>
<tr>
<td>Center point home zone support and Home zone radius</td>
<td></td>
<td>An optional setting that enables you to specify a radius that spans a technician's starting location. During the routing process penalties are assessed for assigning activities beyond this radius. The further away the activity is, the higher the penalty.</td>
</tr>
<tr>
<td>Limit work by points</td>
<td>Check box is cleared</td>
<td>This option is only necessary if you use points to estimate activities. This option limits the number of activities assigned to a resource based on the maximum points allowed within a resource's shift. You must send the point value for each activity through the API. This option displays only when Center point home zone support is checked.</td>
</tr>
</tbody>
</table>

The following table describes the values you must set in the **Filter parameters** screen to create a dynamic routing profile:
**Setting** | **Value** | **Explanation**
--- | --- | ---
Load Resources for | 120 minutes 2 activities | Dynamic routing enables you to control the number of activities that should be placed on the resources’ schedules, or the amount of time that should be filled on the resources’ schedules. 120 minutes means that the routing plan fills the resource's next 120 minutes with activities and 2 activities means that the routing plan assigns, at most, two activities to the resource.

Stop loading when any limit is exceeded | Check box is cleared | When checked, this option instructs the routing plan to stop adding activities to the resource's schedule when either the activity limit or the time limit is reached.

Stop loading when both limits are exceeded | Check box is selected | When checked, this option instructs the routing plan to stop adding activities to the resource's schedule when both the activity limit and the time limit is reached.

Assign activities even if the assignment causes overtime | Check box is selected | When you select Assign activities even if the assignment cause overtime, routes are optimized for travel time and work, but resources might need to work past their scheduled working hours.

Do not assign "overtime" activities and leave them in the bucket | Check box is cleared | When checked, this option instructs the routing plan to stop adding activities to the resource's schedule when both the activity limit and the time limit are reached.

The following table describes the values you must set in the **Resource overtime** screen to create a dynamic routing profile:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not assign activities with more than ___ min. overtime</td>
<td>Check box is cleared</td>
</tr>
<tr>
<td>Do not assign activities that are unlikely to be finished in ___ min. before end of resource’s day</td>
<td>Check box is cleared</td>
</tr>
</tbody>
</table>

**Note:** When you select Assign activities even if the assignment cause overtime, routes are optimized for travel time and work, but resources might need to work past their scheduled working hours.

The typical selection for this setting is Minimize summary travel even if some specific activities have long travel. This option produces routes with optimized travel times for the entire organization, but not necessarily for each individual resource. As a result, a few activities might require long travel times, but the amount of travel for the whole group is optimized.
Change the Optimization Goal

You can now select optimization goals for the routing plan and set routing plan parameters in an optimal way. When you select an Optimization Goal, routing tweaks the variable parameters (costs) and suggests changes to the routing plan parameter:

Migration

During the migration process, re-optimization goals are migrated to optimizations.

This table provides the re-optimization goals and new optimizations goals:

<table>
<thead>
<tr>
<th>Legacy Re-optimization Goal</th>
<th>New Optimization Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimize routes</td>
<td>Default</td>
</tr>
<tr>
<td>Assign high priority activities</td>
<td>Maximized assigned activities number</td>
</tr>
<tr>
<td>Reduce overdue</td>
<td>Reduce activities overdue</td>
</tr>
</tbody>
</table>

To set optimization goal for a routing plan:

1. Navigate to the **Routing** screen.
2. Select the routing plan that you want to modify in the list.
3. Click the **Modify** link to display the **Modify routing plan** dialog.
4. Expand the Optimization Strategy section and select an Optimization goal from the drop-down list:
   - This figure shows the Modify routing plan dialog with the Optimization goal options:
5. When you select an Optimization Goal, routing tweaks the variable parameters (costs) and suggests changes to the routing plan parameter.
   - Default—Ensures that there are no changes in the general routing behavior in comparison with previous versions. This is the default value.
   - Maximize assigned activities number—Slightly pushes the routing optimization behavior so that more activities are taken to the routes in total even if it requires more travel. If moving the activities between resource routes is ON, the routing plan will start only if there are non-assigned activities with high or highest non-assignment cost and the results are applied only if at least one such activity is assigned. The suggestions listed also help in setting up a routing plan to assign activities more aggressively.
   - Minimize total travel—Slightly pushes the routing optimization behavior such a way that less travel is involved even at the cost of lesser total activities number. The suggestions listed also helps to set up a routing plan to minimize travel more aggressively.
   - Maximize activities per resource ratio—Slightly pushes the routing optimization behavior in accordance to real travel time or distance in such a way that activities are assigning to less number of resources, leaving some of them completely free if possible. This option is recommended if there more personnel in the bucket that are needed for today and user would like to transfer resources to another bucket for
some time. The suggestions listed also helps to set up a routing plan to minimize number of assigned resources.

- Reduce activities overdue—If moving the activities between resource routes is ON, the routing plan will only start if there are activities to be processed with high or highest overdue penalty and actually assigned with overdue and the results are applied only if the resulting overdue was decreased by given percentage. The suggestions listed helps to set up a routing plan to minimize number of activities having overdue and total overdue value

6. Based on the selected option, internal routing optimization strategy is tweaked for better achieving the goal (with the except of default Balanced mode, which leaves costs untouched)

7. If there are other parameters that are set to sub optimal values according to the selected goal, the suggestions for their values will also be displayed in this section.

8. Click **Update** to save your changes.

## Add an Activity Filter to a Routing Plan

You can use filters to prioritize certain types of activities or resources over others during the routing process. Filters are an alternative to using another routing plan for prioritization.

You must create the filter, set the conditions, and make the filter available for routing first. See *Creating a Filter* for more information.

To configure routing parameters:

1. Navigate to the **Routing Profiles** screen and find the routing plan that you want to add the filter to.
2. Click the **Modify** link.
3. Expand the **Filters** section of the **Edit Routing Plan** screen.
4. Click the **Add activity filter** button.
   - The **Set of activities to be assigned** dialog is displayed.
5. Select the filter that you want to add to the routing plan from the **Activities** drop-down list.
   - A drop-down list is displayed.
6. Select the type of activities to which the filter should be applied from the second drop-down list (if any).
   - **Non-scheduled activities in the routing bucket**. These activities are not currently on any route. They are not assigned to time slots or resources. Routing will attempt to route them during the next run.
   - **Activities in the routing bucket**. These activities are not currently on any route. They are assigned to time slots, but are not assigned to resources. Routing will attempt to route them during the next run.
   - **Preassigned non-scheduled activities**. These activities are already assigned to resources, but they are not assigned to time slots. You can use reoptimization to automatically move these activities during the routing process.

You can add the filter for **Activities in existing routes** by clicking the **Add activity filter** link. These activities are already assigned to resources and time slots. You can use reoptimization to automatically move these activities during the routing process.

7. **Optional**: Under Assignment Cost, assign a cost to this filter.
   - In general, the higher the cost, the less desirable the assignment. If you select **Do not assign**, activities of that type can never be assigned to a resource that meets this filter condition.

   This figure shows the **Set of activities to be assigned** dialog with activity priority levels for the selected activity:
8. Repeat these steps to add additional filters to the routing plan. Arrange the filters in the order that you want them to be applied using drag and drop. The filters are applied in chronological order starting at the top of the list. The * (Other) filter is always applied last.

9. Click OK.

Assignment Cost for Multiple Activity Filters

In this example, the routing strategy includes these steps:

- Do not assign work to contractors.
- Assign activities to in-house resources before all others.

The Contractors filter has the assignment cost Do not assign so that activities are never assigned to contractors.

The In-House filter has a lower assignment cost than the * (Other) filter so that in-house personnel receive activities before all other resources.

Configure an Activity Filter for Routing

Once you have added a filter to a plan, you can adjust some additional settings that affect how the Oracle Field Service Cloud Routing Cloud Service module processes the filtered activities.

Note: Evaluate these settings carefully before changing them. They add constraints to the routing process that can significantly restrict the number of activities that are assigned to routes.

To configure an activity filter:

1. Navigate to the Routing Profiles screen and find the routing plan that you want to add the filter to.
2. Click Actions and select Modify to open the Edit Routing Plan screen.
3. Expand the Filters section of the Edit Routing Plan screen.
4. Find the filter that you want to configure and click Settings.

The following figure shows the Filter Parameters screen:
5. Select options for this filter based on your business goals and click Submit:
   - **Late arrival penalty:** The weighting options regarding lateness penalties range from “minimal” to “highest.” Examples are provided to assist in selecting the best option. The application uses this information to weigh activity assignment decisions when there's a chance that a resource will arrive late to an activity.
   - **Assigning activities which are about to be late:** You can set a “lateness tolerance” that the application will accommodate when assigning new activities to resources.

   **Note:** For preassigned activities, use the **Do not assign activities with more than X minutes overdue** option with a high X (for example 1000) value. Do not use **Assign activities even if resource is unlikely to arrive inside time slot** option.

   - **Cost of not assigning an activity:** If there is a chance that an activity that meets the conditions of this filter might not be assigned, then this option provides the application with a setting that it will weigh against other considerations to determine who will be assigned which jobs – and which might remain in the bucket. In essence, this helps the application prioritize certain types of activities.

   **Tip:** The **normal** setting sometimes leaves too many activities unassigned. When this happens, test your results with the **high** setting or the **highest** setting.

   - **Allow rescheduling of activities from one day to another within routing plan period:** Use this option to reschedule activities in a segmentable activities routing plan. When this option is selected, only the activities for which the option is selected are rescheduled within the period that the routing plan runs. For example, if you have a segmentable activities routing plan that spans for five days, and you want to reschedule an activity that was supposed to be started on the second day, the activity will be rescheduled either for the third, fourth, or the fifth day. If an activity cannot be rescheduled, an appropriate message is displayed. Remember, the results of running a segmentable activities routing run without rescheduling is the same as running single-day runs for the same number of days.
Assign Activities to Temporary Resources

Normally routing considers activities from a given bucket and routes it down through the children in the hierarchical tree. However, there could be a situation where a resource must be temporarily assigned to work in an area, which is not part of the parent resource hierarchy. To handle such situations, routing can be configured to use resources from different parts of the resource tree.

To enable the feature, follow this process:

1. Select the **Work zone support** check box on the **Business Rules** screen.
2. Assign one (or more) work zones common with the routing bucket to the resource on the **Resource work zones** screen. You must assign the Work Zone to the resource, and not to the parent organization unit. Work Zones assigned to the parent Organization Unit (bucket or organization) will not be used for this purpose.
3. On the routing plan editor, open the **Filters** section and check the **Use resources outside the routing bucket** check box.

After you have followed the steps mentioned earlier, resources that are permanently located in the bucket and the resources that are temporarily assigned are treated equally while assigning activities. This is available for manual, once a day, recurrent or sequential routing plans. The Routing screen shows the number of resources available for the given bucket and routing plan. As with other routing plans, Routing takes into account the work skill levels, work zone ratios, work schedules, locations and all other parameters while routing activities for temporary resources.

**Note:** The assign activities to temporary resources feature is not available for immediate or urgent routing plans.

Suppose that you have enabled the **Organizations** option and you have more than one organization defined. In this case, the activities are routed to the temporary resource only if the resource’s organization matches with either the bucket’s organization or the organization of any bucket or organization unit down the hierarchical tree. Suppose that you run a routing plan simultaneously on two (or more) buckets, which could be at different levels, but share the same resources that are either temporarily assigned or present in the tree hierarchy. The subsequent plans are paused until the previous plans finish running. This might lead to a delay in displaying the routing run results.

Enable or Disable Activation of the Route for a User Type

You can now enable or disable activation or reactivation of the route for a particular user type:

To enable or disable activation or reactivation of the route for a user type, use these steps.

1. Click the Navigation button and select Configuration.
2. In the User Types configuration page, select the desired user type.
3. Click the **Enable GPS Telemetry in Mobility** check box under the Permissions section.
4. To enable route activation, clear the **Disable route activation if geolocation is not enabled on device** check box.
5. To disable route activation, click the **Disable route activation if geolocation is not enabled on device** check box.
This indicates that the route is not activated. Location services are turned off on the device. When you log into Oracle Field Service Cloud and try activating the route, you will see a warning message to enable location services first. Warning messages are as follows:

- **Browser:**
  - Error Message: Route Activation requires your location.
  - Action: Enable location sharing on your device. Once enabled, refresh the browser page and “allow” location access when requested.

- **iOS app:**
  - Error Message: Route Activation requires your location.
  - Action: Enable location access in your iOS settings.
  - To enable location services, navigate to Device Settings, Privacy, Location Services

- **Android app:**
  - Error Message: Route Activation requires your location.
  - Action: Click the Enable Now button to turn on location services.
5 Routing Strategy

Test a Routing Strategy

After you set up a new routing strategy or make changes to an existing routing strategy you can review the effectiveness using three different reports.

The reports are as follows:

- Routing Comparison Report: This report displays the same statistical data about two separate routing runs so that you can compare the results. See Comparing two Routing Runs for more information.
- Routing Module Report: This report displays statistics about the routing results so that you can assess the effectiveness of your routing strategy. See Assessing Summary Data about Routing Strategies for more information.

Tip:

- Do not make changes to your routing strategy until you have accumulated at least five days of data. The more data the system has to interpret, the more meaningful the results are.
- Change one routing setting at a time. If you change more than one setting at a time, you cannot be sure which setting caused the effect you see in the results.

Identify Errors in a Routing Run

You can view routing results in the Routing Runs list under the Execution Summary block in the Routing screen.

You can see the detailed report displaying any errors that the application might have encountered during the routing process.

To identify errors, follow the steps:

1. In the resource tree, select the bucket used for the routing run.
2. Navigate to the Routing screen.
3. Click Execution Summary to display the list of routing runs.
4. Locate and select the routing run that you want to view.
5. Click the Report tab.

The routing results window is displayed, listing where each activity was routed from and which resource it was routed to. Errors are also displayed in this screen.

The following figure shows the routing results, including errors and comments:
   - **Initial resource**—Specifies the resource from whom the activity was routed from.
   - **Destination resource**—Specifies the resource to whom the activity was routed.
   - **Activity**—Specifies the activity.
   - **Travel estimation method**—Shows the method of distance and/or time estimation for travel to each activity in the routing report. These methods are available for travel estimation:
     - *Not estimated*—Indicates that no travel estimation is done; This is a rare status in this report.
     - *Using Defaults*—Travel estimation uses company default values (see Default travel average time in minutes in the Configuration, Statistics page).
     - *Statistics*—Travel estimation uses company travel statistics
     - *Airline Distance*—Shows the airline distance using Airline distance speed in km/h parameter in the Configuration, Statistics page.
     - *Airline Distance and Statistics*—Shows the weighted average of value from company travel statistics and airline distance (see Coordinate calculation weight in the Configuration, Statistics page).
     - *Manual Adjustment*—Travel estimation is manually adjusted via interface
     - *Street Level Routing*—Time and distance are obtained from the Street Level Routing, provided the External Adjustment is adjusted via API.
     - *Same Location*—Indicates that no travel is needed as both activities take place in the same location.
   - **Error/Comment**—Displays any error or comment if available.

### Routing Message Codes

The following table provides the message codes:
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000</td>
<td>Dynamic routing</td>
<td>This is a common error that you can expect to see when using dynamic routing. It means the activity was filtered out because it falls outside the dynamic routing time or activity limitations. If you want to route the activity, change either the dynamic routing time or activity limitations, or turn dynamic routing off.</td>
</tr>
<tr>
<td>6001</td>
<td>Both work length and key are undefined</td>
<td>This is a data validation error. The application needs to know the estimated activity length. It can be specified either through stats or directly in the case of activities. If this error message displays it means this value is not specified and therefore the activity cannot be routed. You should never see this error message under normal circumstances. To correct this error specify the estimated activity length.</td>
</tr>
<tr>
<td>6002</td>
<td>Negative cost is not allowed</td>
<td>This is a data validation error. Activity cost is used as a multiplier for all activity related penalties and to implement activity priorities. You should never see this error message under normal circumstances.</td>
</tr>
</tbody>
</table>
| 6003 | No appropriate resources | This means that the activity has requirements that cannot be met by any available resources. This message does not necessarily indicate an error. It informs you that the application could not find a matching resource for the activity. Check the following settings to confirm that they are accurate for your mobile workforce:  
  - Work Zones  
  - Work Skills  
  - Points (if you use them)  
  - Resources Calendars |
<p>| 6005 | Service window start is greater than service window end | This is a data validation error. The service window end time falls before the service window start time on the activity. |
| 6007 | Unacceptable overdue | The activity was not scheduled because it would be late and would start after the lateness settings specified in the filter parameters. Check the settings in the filter parameters. Go to the Filters section of the routing plan and click Settings to view filter parameters. |
| 6008 | Resource overloaded or has not enough resources | The activity was left unscheduled because of the Limit work by points parameter. The assignment of this job would have caused a tech to incur more points than his max threshold. You can adjust the resource’s point allotment in Daily View. |
| 6009 | Resource workday stop | The activity was left unscheduled because it would have caused overtime for the resource. If you want to allow overtime for resources, change the Resource Overtime settings in the routing plan. |
| 6010 | Unacceptable travel time | The activity was left unscheduled because the travel time would have exceeded the maximum travel time allowed. If you want to allow longer travel, change the Travel time settings in the routing plan. |
| 6011 | Linked activity cannot be scheduled | Activity was unscheduled due to the master activity in the linked activities (activity link) hierarchy. The activity was unassigned due to link requirements. |
| 6012 | Link Cycle | Activity was unscheduled for break dependency cycle between linked activities (activity link). |
| 6013 | Unable to fit activity link | Activity was unscheduled because the application was unable to find route that didn’t violate linked activity requirements. |
| 6014 | Effective service window start is greater than effective service window end | This is a data validation error. After applying all time related constraints, the activity should be ended before it can be started. Usually, this occurs because of an error in the data. |</p>
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6015</td>
<td>SLA window start is greater than SLA window end</td>
<td>This is a data validation error. Activity claims that the SLA window will end before/earlier than the SLA window will start. Usually, this occurs because of an error in the data.</td>
</tr>
<tr>
<td>6016</td>
<td>May cause SLA violation</td>
<td>Activity was unscheduled because it would cause a SLA violation by another following activity. It is normal to obtain this unscheduling reason when using SLA windows.</td>
</tr>
<tr>
<td>6017</td>
<td>Other</td>
<td>Reserved for cases where there are no other specific or precise unscheduling reasons. There is a very low chance to see this error code.</td>
</tr>
<tr>
<td>6018</td>
<td>Other</td>
<td>Activity was not routed as it produces suboptimal routes either by itself or by its consequences.</td>
</tr>
<tr>
<td>6019</td>
<td>Unacceptable SLA overdue</td>
<td>Corresponds to the Unacceptable SLA Overdue protection.</td>
</tr>
<tr>
<td>6020</td>
<td>Provider preferences</td>
<td>Activities cannot be assigned without Provider Preferences violation.</td>
</tr>
<tr>
<td>6021</td>
<td>May cause unacceptable overdue on another activity</td>
<td>Assignment will cause unacceptable overdue on another activity</td>
</tr>
<tr>
<td>6022</td>
<td>May cause unacceptable overtime on another activity</td>
<td>Assignment will cause unacceptable overtime on another activity</td>
</tr>
<tr>
<td>6024</td>
<td>Unable to reach activity</td>
<td>Street level routing engine cannot make a route from the giving activity to any of the activities in the route. This occurs due to an error in the data. Check the activity address and the coordinates.</td>
</tr>
<tr>
<td>6025</td>
<td>Unacceptable travel distance</td>
<td>The activity was left unscheduled because the travel distance would have exceeded the maximum travel distance allowed. If you want to allow longer travel, change the Travel distance settings in the routing plan.</td>
</tr>
<tr>
<td>6063</td>
<td>Link constraint violation</td>
<td>Linked activities: Assignment will cause link constraint violation</td>
</tr>
<tr>
<td>6067</td>
<td>No required Work Zones</td>
<td>No technicians with required Work Zones available</td>
</tr>
<tr>
<td>6068</td>
<td>No required Work Skills</td>
<td>No technicians with required Work Skills available</td>
</tr>
<tr>
<td>6069</td>
<td>No required inventory</td>
<td>Technician does not have the required inventory</td>
</tr>
<tr>
<td>6070</td>
<td>Resource preferences</td>
<td>Assignment will cause Resource Preferences violation. See error code 6003 to understand and resolve this error.</td>
</tr>
<tr>
<td>6071</td>
<td>Not enough points</td>
<td>Technician does not have enough points to perform this activity</td>
</tr>
<tr>
<td>6072</td>
<td>Calendar</td>
<td>No providers with working calendar</td>
</tr>
</tbody>
</table>
Compare Two Routing Runs

You can compare two runs on the same day to see which run was more optimal. This information can help you determine the routing strategy or routing settings that are best for your organization.

This report is most helpful when you use it to compare runs that use the same set of resources and activities. This minimizes the likelihood that influences other than the routing plan are affecting the results.

\[\text{Note:}\] Run this report in the Training instance where the set of activities and resources changes only once every 24 hours. Compare runs that have limited differences so that you can easily identify the setting having the desired effect.

To compare two routing runs:

1. In the Resource Tree, select the bucket for which you want to see routing results.
2. Navigate to the Routing screen.
3. Select the day that the routing runs occurred.
4. Click Execution Summary.
   The Routing screen displays a list of routing runs under the Execution Summary block.
5. Find and click the rows for the routing runs that you want to compare.
6. Click the Comparison tab.
7. Select the run you want to compare from the Compare with drop-down list.
   The Routing Comparison Report displays.
8. Review the results in the Routing Comparison Report.

For example, the **Average mileage** field shows the average mileage per route for travel-enabled activities (in Average Mileage or Average Kilometer based on the units chosen) for each routing run.

The following figure shows the comparison of two routing runs:
Results with a green check mark are the most optimal. Results with a red X are the least optimal. Apart from differentiating the results in colors, you can also review them as text.

Assess Summary Data About Routing Strategies

The Routing Report provides statistics about the results of your routing runs. It is difficult to assess the success of your routing strategy when looking at individual runs or routes. This report consolidates the information from several runs and demonstrates the combined results so that you can measure productivity and drive time.

You can generate report data over almost any time frame and include both historical data and future data. Among other pieces of data, this report presents travel time, work time, and number of activities. This report displays route statistics for each resource in the bucket and a summary of the statistics for the entire bucket. The report helps you:

- Determine the quality of routes.
- Understand past routing performance and the acceptability of future routes in an objective manner.
- Measure performance of the routing engine over time.

The Routing Report presents a summary of the following information about each resource's route:

- Minutes of travel
- Work
- Activity fit %
- Overtime
- Idle time

The report presents either the data for pending activities or the data for completed activities, depending on the time of day that you run it. The report includes the following sections:

- **End of the day, or days later:** Completed activities
- **Beginning of the day:** Pending activities
- **Mid-day:** Part pending activities, part completed activities

To view the Routing report:

1. Select **Routing Report** from the navigation menu.
   The Routing report is displayed.
2. Click **View** and select the date range for the report.
3. Optionally, change the value in the **Rows** field to change the number of visible report rows.
4. Click **Apply**.
5. Review the **Routing Report**:
   - **Aggregator:** Displays the name of the organization to which the resource is assigned.
   - **Resource:** Displays the resource's name as it appears on the Resource Tree.
   - **Date:** Indicates the date of route in Month/Day/Year format.
   - **Jobs:** Displays the number of jobs on the resource's route for that day.
Travel, minutes: Displays the resource’s travel time for the day. Travel time represents total travel time to and from known locations. If an activity (such as lunch) is not a known location, the application will not represent that time in travel time. Similarly, time spent on activities (meetings or lunch), is not represented in the Routing Report.

Work, minutes: Displays the resource’s time spent working on activities for the day.

Job Fit %: Displays the percentage of appropriate fit of resource based on his / her skills compared to the skills required by the activities.

Overtime, minutes: Displays the number of minutes estimated to exceed the resource’s shift for that day. Overtime is defined as any work performed outside the resource’s shift for that day. The application does not take into account the hours worked earlier in the week or the length of shift scheduled for that day. The application just looks for work that is performed outside the shift represented in that day’s working calendar.

Idle time, minutes: Specifies the number of minutes on the route not allocated to activities or travel time.

At the bottom of the report, see the total for the page displayed and total for the report in aggregate.

Roll Back a Routing Run

You can return your activities and resources to the state they were in before you ran a routing plan. You can roll back a single day or a segmentable activities routing plan. Rolling back a routing plan returns the routed activities to the bucket and removes routes from the resources’ calendars. You might want to roll back a routing run during testing or when a configuration mistake causes routing results that are not optimal.

The following conditions must be met for a rollback to be successful:

- The activities must still be in Pending status.
- The activities must still be assigned to the resources that the application assigned them to. Any activities that do not meet these conditions will remain in place on the resources’ routes after the rollback. You can move them back to the bucket manually.

To enable a routing run rollback:

1. In the Resource Tree, select the bucket used for the routing run.
2. Navigate to the Routing screen.
3. Click Execution Summary to display the list of routing runs.
4. Click the row for the run that you want to roll back.
5. Click the **Rollback** button in the routing results window.

All activities and resources are returned to their previous states before a routing run.
6 Routing Visualization

Introduction to Routing Visualization

The Routing screen gives a graphic, visual, and transparent display of what is actually happening in the Routing module.

Looking at the Routing screen, you can see the summary of the Routing Plans assigned to the selected bucket, the autorouting efficiency ratio, the resource utilization ratio and the actual savings achieved as the result of Routing.

To open the Routing screen, click the Navigation button and click Routing.

The Routing screen consists of the resource tree and the Summary Bar. The resource tree in the left part of the screen allows selecting buckets for which data is to be displayed. The resource tree has a hierarchical structure, that is, when a parent bucket is selected, the screen shows aggregated data of its child buckets.

The resource tree on the Routing screen now contains only those resources that are of resource type Bucket with the Routing can assign activities check boxes enabled. For each resource that you select in the resource tree, the Routing screen displays the number of activities for that resource. The calendar widget in the top part of the screen is used to select the date for which Routing data is to be displayed.

Reading the Summary Bar

The summary bar shows the Routing results for the selected bucket. In each case, the data shown in the summary bar is the aggregated data of all individual resources’ routes created as the result of routing runs.

Reading the Routing Plans Block

The Routing Plans block shows the number of scheduled routing plans.

The number next to the puzzle icon is the number of routing plans assigned to the selected bucket or its child buckets, if any.

You can click the Routing Plans block to open the list of profiles assigned to a current bucket and its child buckets (if any).

- If there are no child buckets, only the profile of the current bucket with the list plans will be displayed.
- If no routing profile is assigned to the bucket, it is possible assign routing plans using the Assign link.

Reading the Execution Summary Block

The Execution Summary block shows the list of available resource plans and resource profiles that are active.
The Execution Summary block displays the aggregated data of the statuses of the routing plans assigned to the selected bucket. The following statuses are available:

- **Scheduled**: Indicates routing plans to be run according to the schedule
- **Completed**: Indicates finished routing plans
- **Running**: Routing plans run currently in progress

**Note**: The Rollback option is not available in the Execution Summary block for new activity broadcasting.

When you select the **Immediate routing via Collaboration** option, the **Report** tab in the **Automatic Routing** window is updated with the following details:

- **Destination Resource**: Displays the user to which the activity is assigned.
- **Average Mileage**: Displays the Average Mileage per route for travel-enabled activities (either Average Mileage or Average Kilometer, depending on the units chosen)
- **Error/Comments**: Displays the Activity Status, namely, error messages or success messages.

When you select another bucket from the resource tree, the Execution Summary block refreshes to display only those resource profiles and resource plans that are available for the selected resource. The Execution Summary View shows 0 of 0 for **Assigned activities**, when activities are reassigned between resources or assigned back to the bucket during re-optimization. Only activities assigned from the bucket to a resource during optimization are added in **Assigned activities**.

### Reading the Autorouting Block

The Autorouting block shows the efficiency of automatic Routing in percent. The Autorouting block includes both scheduled activities for the date selected and non-scheduled activities that were routed but not necessarily by the date selected.

The Autorouting efficiency is calculated as the ratio of the number of autorouted activities to the total number of routed activities (both automatically and manually). This statistics takes into account the number of operations resulting in 'meaningful' changes to the activity routing, that is, changes to the date of the route or the resource to whose route the activity has been assigned. Operations bringing no changes to the activity date or resource to which the activity is assigned, are ignored. Similarly, reverse operations resulting in no change to the initial activity assignment are ignored, as well.

The figures shown in the Autorouting block are aggregated results of all resources in the selected bucket and its child buckets, if any. If no activities were routed manually, the Autorouting efficiency is 100%. The Autorouting drop-down menu contains the following data:

- **Manually processed**: Displays the number of manually routed activities
- **By Dispatcher / By Resource**: Allows viewing the number of manual operations performed by the dispatcher or by the resource. This section contains the breakdown of manual operations in the following types:
  - **Assigned**: Activities moved from the bucket to resources’ routes
  - **Reassigned**: Activities moved between resources
  - **Unassigned**: Activities moved from resources’ routes to the bucket
Reordered: Activities moved to a different position in the route. The Reordered category is not available in manually processed By Resource column

Total amount of manually processed activities {number} (of {number})

Reading the Resource Utilization Block

The Resource Utilization block shows the efficiency of resources working time use in percent.

The resource utilization ratio is calculated as the ratio of the actual resource useful time to the useful time defined by the baseline settings. The resource utilization block displays the aggregated result of all routes created as the result of Routing in the selected bucket.

The Useful Time section consists of Working Time (the time spent by the resources for actual activities performance), Overtime and Travel Time. The window also includes the Idle Time section, which is the waiting time between activities.

Reading the Savings Block

The Savings block shows the value of savings achieved by the Routing runs in the selected bucket. It is possible to view the cost savings, that is, the money which the company can save by applying the Routing results, or the time savings, that is, the working time which can be gained or travel time and overtime which can be reduced by applying the Routing results. The savings amount is calculated on the basis of the Baseline Settings defined in the same window.

Both the Cost savings and the Time savings options show the total savings and their breakdown as follows:

- **Work time increase**: Increase of the time spent on actual activities performance which can be represented as actual time in hours and minutes (Time savings) or converted to money according to the Baseline Settings (Cost savings)
• **Travel time reduction:** Reduction of the time spent on travel between activities which can be represented as actual time in hours and minutes (Time savings) or converted to money according to the Baseline Settings (Cost savings)

• **Overtime reduction:** Reduction of the overtime created for the resources as the result of Routing run which can be represented as actual time in hours and minutes (Time savings) or converted to money according to the Baseline Settings (Cost savings)

The value in the **Savings** block is the sum of the three values mentioned earlier.

In some cases savings values may be negative when some technicians in the bucket were not assigned enough activities to earn their daily salary. However, such negative result may be compensated by other optimizations and the overall routing result may be positive.

### Configure Routing

The Routing functionality shows the savings achieved for the selected bucket as the result of Routing runs. This requires setting the average company parameters based on the existing statistics of the company business. In Oracle Field Service Cloud these parameters are called Baseline Settings.

To configure routing parameters:

1. Click **Baseline Settings** to open the list of parameters that need to be configured.
2. Set the following parameters:
   - **Fully-loaded resource hourly cost:** Cost of 1 hour of the resource's work based on the resource's salary, benefits, training, overhead costs, equipment costs or depreciation in US dollars. When the **Time savings view** is selected, this setting is disabled as it has no influence on time savings
   - **Cost per mile:** Cost of one mile of the resource's travel in US dollars (or cost of one kilometer of the resource's travel in your local currency). When the **Time savings view** is selected, this setting is disabled as it has no influence on time savings
   - **Overtime increase:** Resource's hourly cost increase in case of overtime in per cent
   - **Average resource daily work time:** Average time the resource spends on activities performance in a day in hours
   - **Average resource daily travel time:** Average time the resource spends on travel between activities in a day in hours
   - **Average resource overtime:** Average acceptable overtime per resource in hours
   - **Travel speed:** Average speed with which resources travel in miles per hour

### Routing Tabs Displayed on Mobile Devices

Routing screen tabs have been improved to allow smooth functionality on all the devices such as mobile phones and all screen sizes.

You can create, modify and start routing plans, set baselines, and review the routing results from any device supported by Oracle Field Service Cloud. The Routing screens are now easy to use on all the devices supported by Oracle Field Service Cloud, compatible with different screen sizes including mobile phones.
The following figure shows how the tabs align vertically when the **Routing** screen is accessed from a mobile device:

The following sections discuss how Routing screen tabs appear on devices with different display sizes.

**Routing Tabs Displayed in Web Browsers:**

The following figure shows the **Routing Plans** Tab of the **Routing** screen:
The following figure shows the **Routing Execution** Tab of the **Routing** screen:
The following figure shows the **Results** Tab of the **Routing** screen:
The following figure shows the **Savings** Tab of the **Routing** screen:
Routing Tabs Displayed in Devices with Smaller Display Size:

The following figure shows the Routing Plans Tab of the Routing screen:
The following figure shows the **Routing Execution** Tab of the **Routing** screen:
The following figure shows the **Results** Tab of the **Routing** screen:
The following figure shows the Savings Tab of the Routing screen:
Routing Tabs Displayed in Mobile Devices:
The following figure shows the **Routing Plans** Tab of the **Routing** screen:
The following figure shows the **Routing Execution** Tab of the **Routing** screen:
The following figure shows the **Results** Tab of the **Routing** screen:
The following figure shows the **Savings** Tab of the **Routing** screen:
Manual and Automatic Routing Run

Routing Plans scheduled to run according to the Run schedule settings are run automatically at the scheduled time. However, each Routing Plan assigned to the selected bucket can be started manually when necessary.

Run a Routing Plan Manually

You can run a routing plan that is assigned to a bucket either manually or automatically. This procedure describes how to run a routing plan manually.

The puzzle icon that is used to run a routing plan manually is controlled by the Routing visibility. When the visibility is disabled for a user, the puzzle icon is hidden and the user cannot start routing plans manually.
To run a routing plan manually:

1. Navigate to the **Activities** screen (Time View, List View and Map View).
2. Select a bucket in the resource tree and click the puzzle icon.

   The list of all routing plans assigned to the bucket is displayed. The list also shows the number of non-assigned activities in the bucket and the number of available resources, as shown in the following figure:

   ![Routing Plan List](image)

   **Note:** When a resource other than bucket is selected, the puzzle icon is hidden.

3. Click **Run**.

   A confirmation dialog appears prompting you to confirm that you want to manually start the selected plan.

4. Click **OK**.

   The **Manual routing** window with processing icon is displayed. The title of the window displays the Routing Plan name and the ID. When the routing plan is running, the window shows a shuffling puzzle representing the progress of the routing run. The right pane shows the Routing run statistics.

   This image displays the Summary tab in the routing results window:

   ![Routing Results Summary](image)

5. Review the following fields on the Results window

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources used</td>
<td>Indicates the total number of resources to which activities have been assigned.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Routed activities</td>
<td>Indicates total number of activities assigned by Routing. This section also includes the percentage of the assigned activities in the total number of activities in the bucket and the percentage of activities assigned with SLA overdue.</td>
</tr>
<tr>
<td>Non-Routed activities</td>
<td>Indicates the total number of activities not assigned by Routing in the current run with their breakdown by non-routing reasons.</td>
</tr>
<tr>
<td>Rejected activities</td>
<td>Specifies the number of activities which could never be assigned in the current conditions and the reasons for their non-assignment. For example, if some activities cannot be assigned as no resource in the selected bucket meets all their requirements, such activities will be rejected. The number of rejected activities is included in the total number of non-routed activities.</td>
</tr>
<tr>
<td>Average working time</td>
<td>Indicates the average time resources spend on performing activities in a working day and its ratio against the baseline figure.</td>
</tr>
<tr>
<td>Average overtime</td>
<td>Indicates the average overtime created as the result of the Routing run and its ratio against the baseline figure.</td>
</tr>
<tr>
<td>Average travel time</td>
<td>Specifies the average travel to be performed by resources as the result of the Routing run and its ratio against the baseline figure.</td>
</tr>
<tr>
<td>Average down time</td>
<td>Indicates the average idle time created as the result of the Routing run and its ratio against the baseline figure.</td>
</tr>
<tr>
<td>Average Mileage</td>
<td>Specifies the average mileage per route for travel-enabled activities (in Average Mileage or Average Kilometer based on the units chosen).</td>
</tr>
<tr>
<td>Resource utilization</td>
<td>Specifies the efficiency of resources working time use in per cent.</td>
</tr>
<tr>
<td>Routing run time</td>
<td>Indicates the time in which the Routing run was completed.</td>
</tr>
<tr>
<td>Days</td>
<td>Indicates the total number of days in the period for which segmentable activities routing run is planned for.</td>
</tr>
<tr>
<td>Resources</td>
<td>Indicates the total number of resources in the bucket.</td>
</tr>
<tr>
<td>Activities</td>
<td>Indicates the total number of activities in the bucket.</td>
</tr>
<tr>
<td>Savings</td>
<td>Specifies the financial savings achieved by the Routing run broken down into:</td>
</tr>
<tr>
<td></td>
<td>- <strong>Working time optimization savings</strong>: Savings achieved as the result of resources’ working time increase</td>
</tr>
<tr>
<td></td>
<td>- <strong>Overtime optimization savings</strong>: Savings achieved as the result of overtime reduction</td>
</tr>
<tr>
<td></td>
<td>- <strong>Travel time optimization savings</strong>: Savings achieved as the result of travel time reduction</td>
</tr>
<tr>
<td>Total savings</td>
<td>Indicates the sum of Working time optimization savings, Overtime optimization savings, and Travel time optimization savings.</td>
</tr>
</tbody>
</table>
When the routing run completes, its results are immediately applied, that is, the activities are placed in the resources’ routes. To reject the routing run results, you can click **Rollback** (the activities will be returned to the bucket).

**Automatic Routing Run**

Automatic Routing runs require no user actions to start. When a Routing Plan is run automatically, no pop-up windows appear. The Routing plans that are currently running are shown in the **Running** status under the **Execution Summary block**. Click the line of a running Routing Plan to open the **Automatic Routing** window that has the behavior and functionality similar to that of the **Manual Routing** window described previously.

**Unlimited Queued Routing**

Oracle Field Service Professional and Enterprise Cloud subscribers will have access to unlimited queued routing. Routing runs will be prioritized into High Priority and Standard Priority runs with High Priority runs being processed prior to Standard Priority routing runs. Each subscription and Instance type will have a number of high priority hours allocated per day where the hours will reset daily at 00:00UTC.

<table>
<thead>
<tr>
<th>Subscription Type</th>
<th>Oracle Field Service Professional</th>
<th>Oracle Field Service Professional</th>
<th>Oracle Field Service Enterprise</th>
<th>Oracle Field Service Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance Type</td>
<td>TEST</td>
<td>PROD</td>
<td>TEST</td>
<td>PROD</td>
</tr>
<tr>
<td>High Priority (hours/day)</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Standard Priority (hours/day)</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
</tbody>
</table>

Users can manage the routing run time using the Time Limit parameter in the Run Schedule section of the Routing Plan. The actual run time used is displayed on the Execution Summary page for each individual routing plan that has been executed. Any routing plan that take less then 1 second to execute with consume 1 second in the calculation.

Beginning daily at 00:00 UTC, any configured and executed ‘manually’, ‘once a day’, ‘recurrently’ and ‘sequentially’ routing run will be automatically assigned a High Priority status. Each executed routing run will reduce the number of High Priority hours available that day. After the allotted number of High Priority hours is consumed for an instance, all subsequent routing runs will default to the Standard Priority where they will be processed based on their priority.

**Example Scenario**

Following is an example scenario:

- Subscription Type = Oracle Field Service Professional
- Instance Type = TEST
  - High Priority (hours/day) = 1 hour
  - Standard Priority (hours/day) = Unlimited

- Routing setup:
- Routing Plan = Bulk
  - Routing Run = Once a Day
  - Run Time = 07:00
  - Time Limit = 15 minutes

- Routing Plan = Daily
  - Routing Run = Recurrently
  - Run Time = 08:30-18:30
  - Interval = 60 minutes
  - Time Limit = 10 minutes

• Outcome:
  - Bulk routing runs in 5 buckets with each bucket's routing run takes 4 minutes to execute.
  - Daily routing runs in 5 buckets with each bucket's daily run takes 1 minute to execute.

<table>
<thead>
<tr>
<th>Type</th>
<th>Time</th>
<th>Total Minutes Used</th>
<th>Priority</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk</td>
<td>07:00</td>
<td>20</td>
<td>High</td>
<td>5 Buckets * 4 minutes = 20 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since this is the first run after 00:00 UTC</td>
</tr>
<tr>
<td>Daily</td>
<td>08:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 25 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>09:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 30 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>10:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 35 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>11:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 40 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>12:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 45 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>13:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 50 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>14:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 55 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>15:30</td>
<td>5</td>
<td>High</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Priority since total time used is 60 minutes</td>
</tr>
<tr>
<td>Daily</td>
<td>16:30</td>
<td>5</td>
<td>Standard</td>
<td>5 Buckets * 1 minute = 5 minutes</td>
</tr>
</tbody>
</table>
### Receive Routing Advice from Oracle

Oracle provides services to assist you in assessing your routing needs, developing a routing strategy, and implementing that strategy in Oracle Field Service Cloud. Oracle representatives can also assess your current routing strategy and assist you in improving the results. For details about these services, contact Oracle support.
7 Run and Manage Routing

Start a Routing Plan Automatically

If your routing strategy includes running the module automatically, the routing process requires little in the way of management. In special circumstances, you might need to fine-tune the routing results, or run routing manually. The section includes instructions for performing manual routing tasks. You can configure routing to run automatically.

Start a Routing Plan Manually

Routing is typically run automatically at specific times as determined by your business goals. Sometimes, however, you may need to run routing manually. For example, you might want to run routing manually during the testing phase or if the bucket unexpectedly fills up mid-shift.

You can run any routing plan manually except the immediate ones. You can also have a plan that typically runs automatically or that is scheduled to recur. Manually starting the routing plan once a day or recurrently will cause the next scheduled run to be skipped. The scheduled runs after the skipped one will automatically run according to the schedule.

To run a routing plan manually:

1. In the Resource Tree, click the bucket for which you want to run routing.
2. Click Dispatch.
3. Click Routing from the drop-down menu.
   The Routing screen is displayed.
5. Locate the row for the routing plan to start.
6. Click Actions and select Start manually

7. Click OK.
   The activities are routed to appropriate individuals and the routing statistics are updated. The Rollback button is displayed.

Related Topics
- Identify Errors in a Routing Run
Route an Individual Activity Manually

If an activity is not routed during a routing run, or if you are not satisfied with the way it was routed, you can manually move it to a resource's route.

For more information, see “Moving an activity” in Using Core Manage Cloud Service.

**Note:** If a scheduled activity is not completed before the end of the day, you must recreate it for the following day. The activity cannot be moved or routed after the end of the day.
# 8 Troubleshooting

## Troubleshoot Routing

If the routing results are not what you expect, try the solutions in this section.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than one resource is in the same neighborhood over the course of the day. How can this be the most efficient route?</td>
<td>- The application considers a number of factors when routing activities, including work skills and preferred resources. The resource that was already in the neighborhood might not be qualified to take the other activity in the neighborhood, or might be required on an activity at the same time in another location.</td>
</tr>
<tr>
<td>Resources are crossing paths over the course of the day. How can this be an efficient route?</td>
<td>- The application optimizes routing for the entire workforce, not just one or two individual resources. As a result, you might occasionally notice an individual route that seems to be less than optimal, but overall, the results of the entire routing run are optimized.</td>
</tr>
<tr>
<td>A resource is travelling a long distance to reach an activity even though another resource appears to be closer to the activity. How can this be an efficient route?</td>
<td>- To verify the optimization of the routing run for the entire bucket, view the statistics in the Routing Report.</td>
</tr>
<tr>
<td>A resource's activities seem to be all over the map. How can this be an efficient route?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>When I ran routing a second time, the results were not the same.</td>
<td>- The application considers many factors when routing activities, many of which are continually changing. As the system learns more about your resources, their skill levels and your activities, it makes different, more informed, choices.</td>
</tr>
<tr>
<td></td>
<td>- There are a high number of possible routing combinations. The application considers all of your business goals and then provides a routing result that is as close to your goals as possible. Sometimes there are several routing results that are equally efficient. The results of two routing runs are rarely exactly the same, even with all of the same inputs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routing does not run at the time of day or frequency that I expected.</td>
<td>The Run Schedule is not configured correctly.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic routing ran, but not all activities were assigned to resources.</td>
<td>- The application did not find a resource whose qualifications and availability match the activity.</td>
</tr>
<tr>
<td></td>
<td>- An error occurred during the routing process.</td>
</tr>
</tbody>
</table>
### Symptom
An activity was not routed to the resource that I expected.

<table>
<thead>
<tr>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The resource and the activity are not in the same bucket. Check the Resource Tree to verify that the resource is in the same bucket to which the activity was sent.</td>
</tr>
<tr>
<td>• The resource is either not qualified or not available to take the activity. Verify that work zones, work skills, work skill conditions and resource calendars are all accurate.</td>
</tr>
<tr>
<td>• The application uses a complex algorithm to optimize the routes for the entire workforce, not just individual routes. Also, the application considers a number of factors when routing activities. After considering all parameters for the entire workforce, that resource was not the best match.</td>
</tr>
</tbody>
</table>

### Symptom
Segmentable activity cannot be assigned due to missing required work skills, work zones or mismatch of working calendars

<table>
<thead>
<tr>
<th>Possible Explanations and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom:</td>
</tr>
<tr>
<td>• Routing applied to segmentable activity.</td>
</tr>
<tr>
<td>• The activity cannot be routed for various reasons for various days.</td>
</tr>
<tr>
<td>Solution:</td>
</tr>
<tr>
<td>• Make sure your resources have work zones, work skills and working calendars that are compatible with segmentable activities, which you would like to assign.</td>
</tr>
</tbody>
</table>

**Related Topics**
- Work Zones
- Work Skills and Work Skill Conditions
- Resource Calendar Requirements
- Configure the Run Schedule for the Routing Plan
- Assess Summary Data About Routing Strategies
- Identify Errors in a Routing Run
# Revision History

This document will continue to evolve as existing sections change and new information is added.

<table>
<thead>
<tr>
<th>Date</th>
<th>What's Changed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2019</td>
<td>• Added new sections:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Restriction of Activities Routed Through Immediate Routing Plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Segmentable Activities Assignment Using Bulk Routing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Set the SLR Time Limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Compatibility Parameters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Updated the section, Multi-day Routing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Minor changes for clarity and consistency</td>
<td></td>
</tr>
<tr>
<td>May 2019</td>
<td>• Updated the Bundling of Activities section</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Minor changes for clarity and consistency</td>
<td></td>
</tr>
<tr>
<td>February 2019</td>
<td>• Added a new section Routing Tabs Displayed on Mobile Devices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Minor changes for clarity and consistency</td>
<td></td>
</tr>
</tbody>
</table>