

Homogenic Vehicle Schedule

Work-flow to Use Homogenic Vehicle Schedule

- » Use **Add Preference** to obtain a baseline dialog that sets a Homogenic Vehicle Schedule for a single criterion only
- » Repeat **Add Preference** for additional instances of the baseline dialog
- » Use **Load Template** modify the preference for a wide variety of conditions
- » Repeat **Load Template** for additional instances of any template

Preference Overview

There may be economic advantages in keeping each vehicle on one route, or geographically close routes. The Homogenic baseline preference provides these basic criteria. The Homogenic templates add advanced additional filtering to the basic criteria.

Add Preference Dialog

Purpose:

The baseline dialog provides the simplest form of homogeneity by any one of the criteria, Sign, Route, Region and Route Group.

Prerequisites:

- » To apply Regions, they must be defined as user data in your initial Schedule.
- » You should have already defined your route groups. See Miscellaneous Preferences, **Route Groups**.

Opening Dialog:

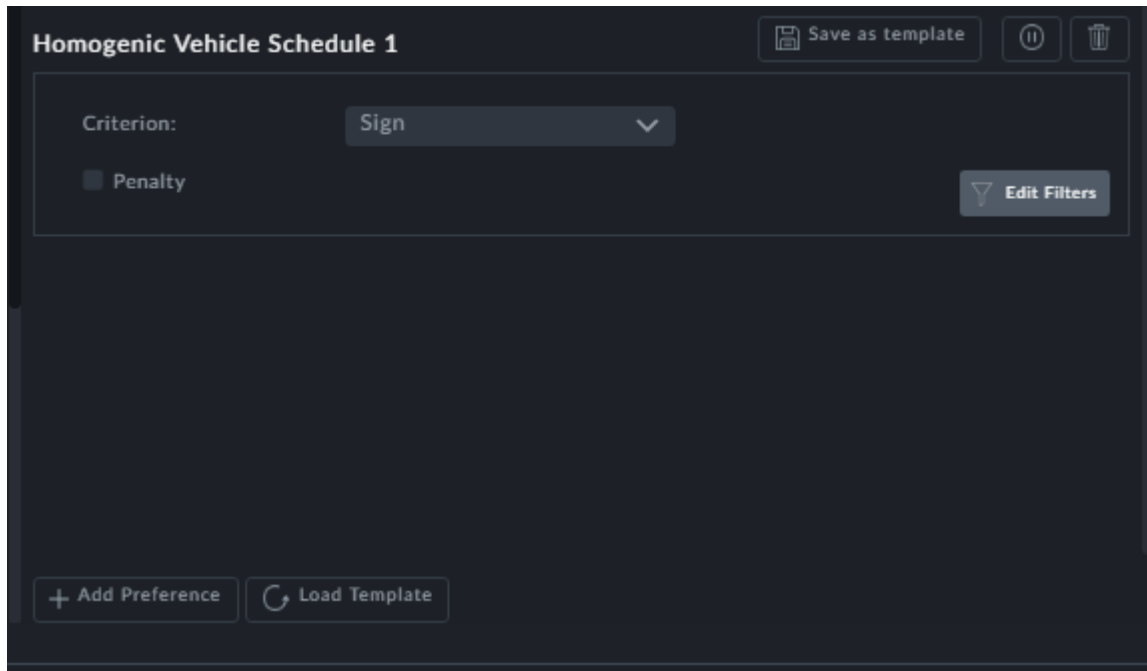


Figure 1-1: Homogenic Vehicle Schedule - Basic dialog

Points to note:

- » The **Criterion** field opens a pick list:

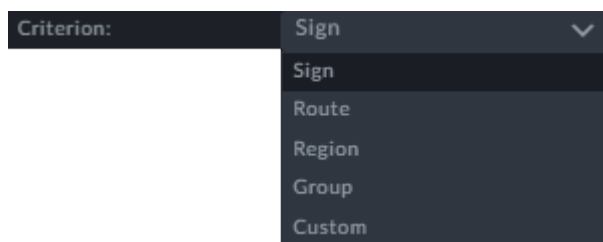


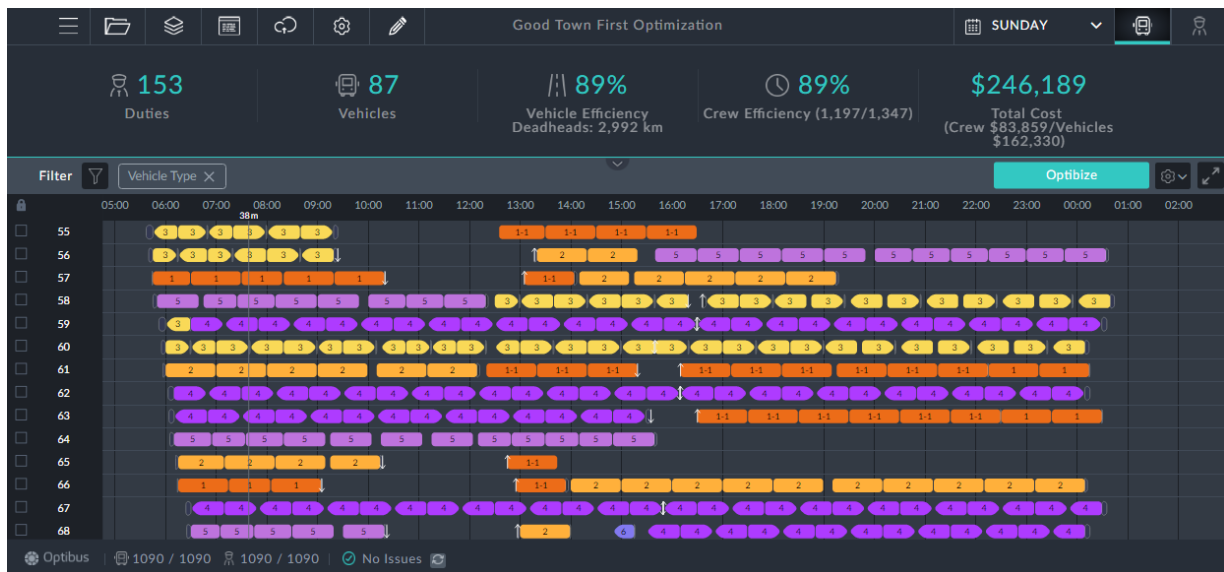
Figure 1-2: Criterion selection

- » This preference may be strict or flexible by assigning a penalty
- » Using **Edit Filters** you can restrict the Homogenic Vehicle Schedule to a time interval
- » Using **Edit Filters** you can restrict it to one or more vehicle types
- » Use **Add Preference** to create additional instances with different Homogenic Vehicle Schedules
- » **Criterion:** The **Custom** item is similar to Expert Mode, primarily intended for use by Optibus Professional Services to create customized criteria

Example 1.

Scenario:

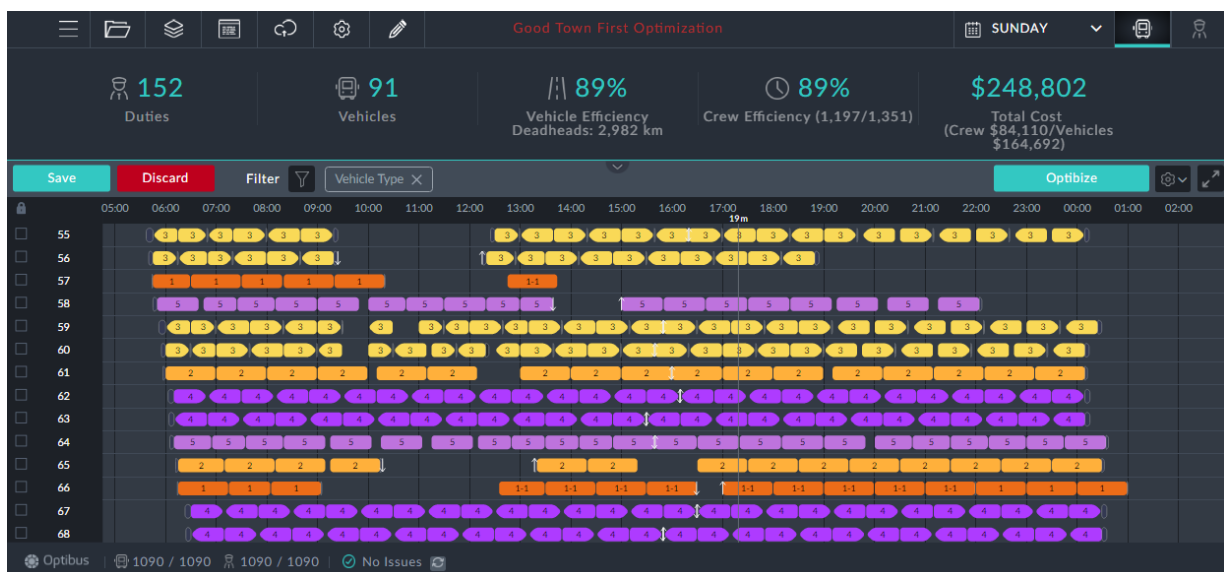
We will create homogeneous routes by Sign for Urban vehicles. Here is a segment of the Vehicles Gantt filtered for Urban vehicles. (The schedule used here has undergone first optimization for Vehicles and Drivers.)



In the preference, choose Sign and then choose Urban vehicles in Edit Filter. Save and optimize.

Outcome:

First, here i is the corresponding segment of the Vehicles Gantt:



The effect on the Gantt is very noticeable: All of the Urban trips are Signs homogeneous. In the KPIs, the number of vehicles has risen significantly, by 4 also reflected in the increased Total Cost.

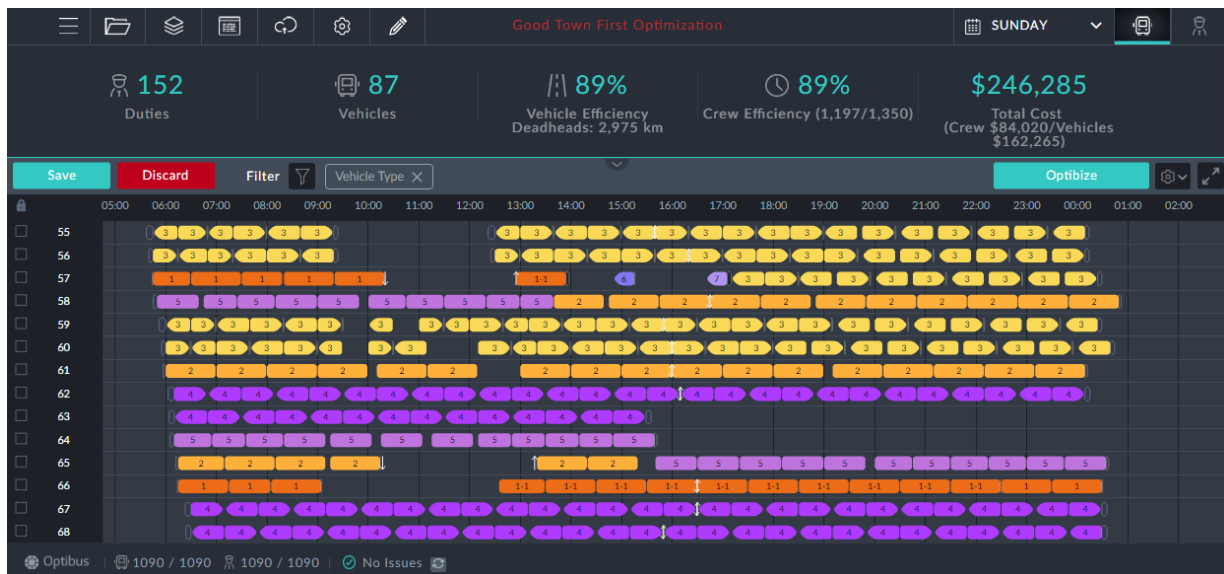
Example 2.

Scenario:

Same as Example 1 but set a penalty of 20.

Outcome:

First, here is the corresponding segment of the Vehicles Gantt:



The effect on the Gantt is still very noticeable, but not all of the Urban trips are Signs homogeneous.

In the KPIs, the number of vehicles has not changed. The Total Cost has increased by a small amount.

This suggests that there is no real loss in making the schedule sign homogeneous. It also suggests that our penalty may be too low to make a difference. If we set the penalty to 50, there is some further relaxation of sign homogeneity. There is a very small increase in Total Cost.

Templates Available from Optibus

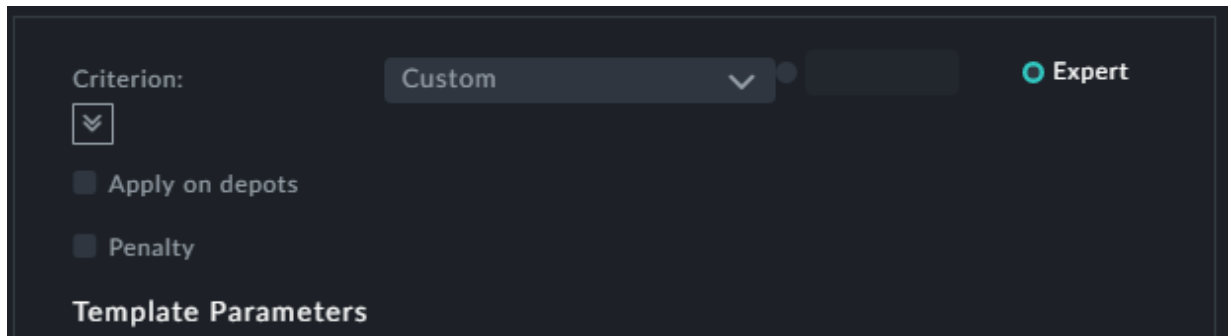
Table 1-1: Templates Summary

Template Name	Purpose	Reference
Override minimum trip duration	This preference extends the minimum trip duration to the time specified for a single route or the whole schedule. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.	Override minimum trip duration
Duration dependent recovery	This preference extends the minimum trip duration by a fixed "layover" percentage for a single route or the whole schedule. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.	Duration dependent recovery

Template Name	Purpose	Reference
Duration dependent recovery - By route group	This preference extends the minimum trip duration by a fixed percentage for a route group. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.	Duration dependent recovery - By route group
Prefer inbound\outbound scheduling - By route sign	This provides for homogeneity where trips are followed by reverse trips.	Prefer inbound\outbound scheduling - By route sign
Route group scheduling	Apply homogeneity to a specific route group.	Route group scheduling
Prefer interline between routes	This preference is the opposite of homogeneity by any one of the criteria, Sign, Route, Region and Route Group.	Prefer interline between routes
Single route scheduling	This preference applies homogeneity for a single sign or a comma separated list of signs.	Single route scheduling
Prefer geographic round trip	This preference sets outbound and inbound trips together with the following relaxation: A trip will still be considered to be "inbound" for this purpose if its destination is within a given distance of the actual start location. A simple example of this is a vehicle leaving from Platform 1 of a large shopping center, but returning to Platform 20, 500 meters from its start location.	Prefer geographic round trip
Adjust deadheads to regulation	Create vehicles schedule so that deadheads conform with driver work regulations (see the Work Limitation preference).	Adjust deadheads to regulation
Keep vehicle in area	This preference is similar to Minimize Vehicle Cruise Preference . Here deadhead distance is minimized to prevent vehicles from doing trips that would take them too far from their "home" depot. Maximum deadhead distance from a depot is used as the homogeneity criterion.	Keep vehicle in area
Adjust depot pull in/out to regulation	This preference is similar to Adjust deadheads to regulation. Recall that Pull in and Pull out are special deadheads.	Adjust depot pull in/out to regulation

A General Note About Homogenic Templates

- » The templates share a common "heading" section that looks like this:



The screenshot shows a dark-themed dialog box titled "Template Parameters". At the top left, the label "Criterion:" is followed by a dropdown menu currently showing "Custom" with a downward arrow. To the right of this is a teal-colored radio button labeled "Expert". Below the "Criterion:" label is a small square icon containing a downward arrow. Further down are two unchecked checkboxes: "Apply on depots" and "Penalty".

- » You should ignore the **Custom** and the **Apply on depots** fields.
- » The **Penalty** field will sometimes be set with a default value. Consider leaving it as is.
- » The baseline dialog and templates are cumulative conditions

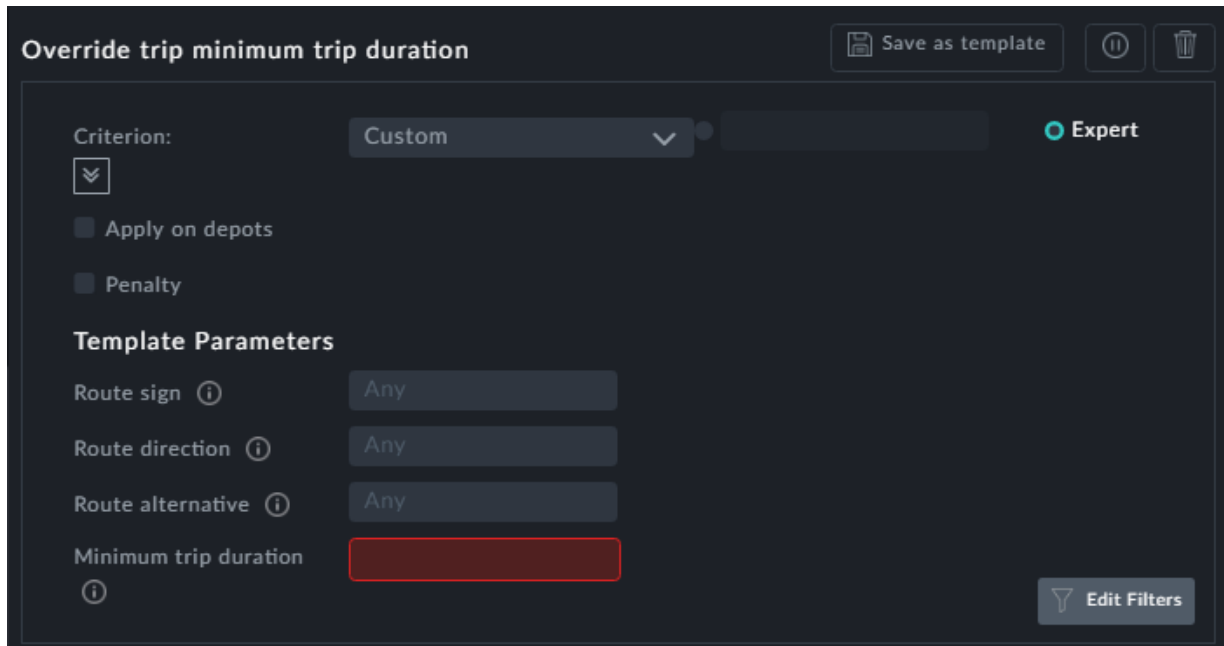
Override minimum trip duration

Purpose:

This preference extends the minimum trip duration to the time specified for a single route or the whole schedule. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.

Prerequisites: None.

Opening Dialog:



The screenshot shows a dark-themed dialog box titled "Override trip minimum trip duration". At the top right, there are three buttons: "Save as template" (with a floppy disk icon), a pause button (with a double vertical bar icon), and a delete button (with a trash can icon). The main content area has a "Criterion:" label followed by a dropdown menu set to "Custom" and a small circular toggle switch. To the right of this is a radio button labeled "Expert" which is currently selected. Below the "Criterion:" section are two checkboxes: "Apply on depots" and "Penalty", both of which are currently unchecked. A section titled "Template Parameters" contains four rows, each with a label, an information icon (i), and a text input field: "Route sign" with "Any", "Route direction" with "Any", "Route alternative" with "Any", and "Minimum trip duration" with an empty field. The "Minimum trip duration" field has a red border. At the bottom right of the dialog is a button labeled "Edit Filters" with a funnel icon.

Points to note:

- » **Minimum trip duration:** This field is mandatory, in minutes.
- » This preference defaults to all routes. You may select several routes by using additional instances of this template
- » This preference may be strict or may be made flexible by assigning a penalty
- » You may create multiple instances of this template for additional routes

Duration dependent recovery

Purpose:

This preference extends the minimum trip duration by a fixed "layover" percentage for a single route or the whole schedule. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.

Prerequisites: None.

Opening Dialog:

Duration dependent recovery

Save as template

Criterion: Custom ▼ Expert

☐ Apply on depots

☐ Penalty

Template Parameters

Layover percentage ⓘ 10

Sign ⓘ Any

Direction ⓘ Any

Alternative ⓘ Any

Edit Filters

Points to note:

- » **Layover percentage:** Note the default value.
- » This preference defaults to all routes. You may select several routes by using additional instances of this template



Tip

To use several routes, place them in a Route Group (see [Route Groups](#)) and then use **Duration dependent recovery - By route group**.

- » This preference may be strict or may be made flexible by assigning a penalty

Duration dependent recovery - By route group

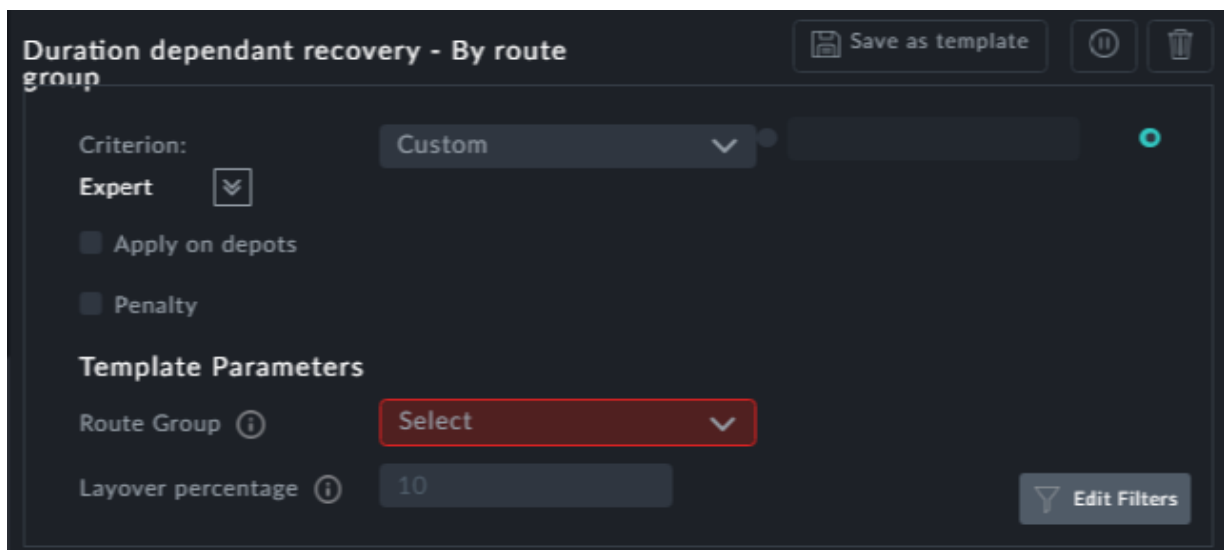
Purpose:

This preference extends the minimum trip duration by a fixed percentage for a route group. It does not change the trip duration as shown in the vehicle information boxes. It simply adds time to the end of trips delaying the trip following.

Prerequisites:

You should have already defined your route groups. See Miscellaneous Preferences, [Route Groups](#).

Opening Dialog:



The screenshot shows a dark-themed dialog box titled "Duration dependant recovery - By route group". At the top right, there are three buttons: "Save as template", a pause icon, and a trash icon. The main content area includes a "Criterion:" dropdown menu set to "Custom", a "Expert" button with a dropdown arrow, and two checkboxes labeled "Apply on depots" and "Penalty", both of which are currently unchecked. Below these is a section titled "Template Parameters" containing a "Route Group" dropdown menu with "Select" as the current value, and a "Layover percentage" input field with the value "10". An "Edit Filters" button is located at the bottom right of the dialog.

Points to note:

- » **Route Group:** This field is mandatory
- » **Layover percentage:** Note the default value.
- » This preference may be strict or may be made flexible by assigning a penalty

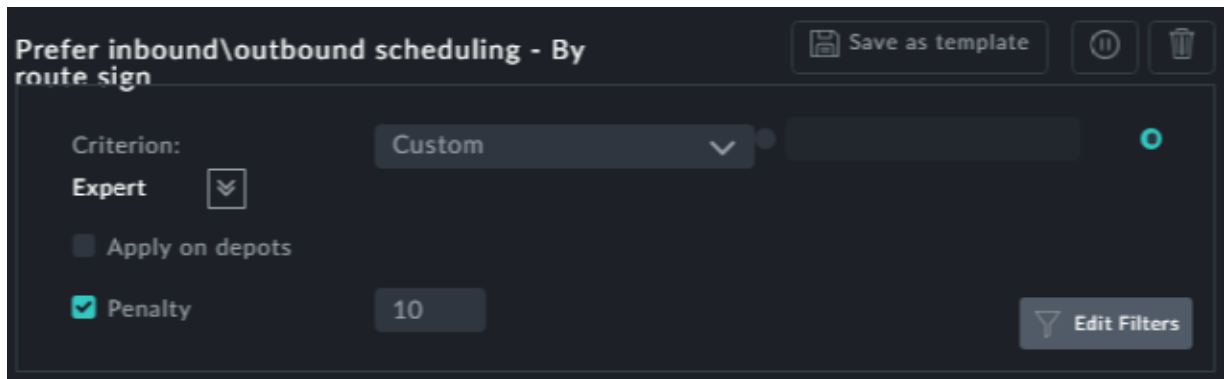
Prefer inbound\outbound scheduling - By route sign

Purpose:

This provides for homogeneity where trips are followed by reverse trips.

Prerequisites: None.

Opening Dialog:



The screenshot shows a dark-themed dialog box titled "Prefer inbound\outbound scheduling - By route sign". In the top right corner, there are three buttons: "Save as template" (with a floppy disk icon), a pause button (with a vertical bar icon), and a trash button (with a trash can icon). The main area of the dialog contains the following controls:

- A "Criterion:" label followed by a dropdown menu currently set to "Custom". To the right of the dropdown is a small teal circle.
- An "Expert" label with a dropdown arrow icon.
- An unchecked checkbox labeled "Apply on depots".
- A checked checkbox labeled "Penalty" followed by a numeric input field containing the value "10".
- An "Edit Filters" button with a funnel icon.

Points to note:

- » This preference sets a default penalty
- » The only variations possible are through **Edit Filters**

Route group scheduling

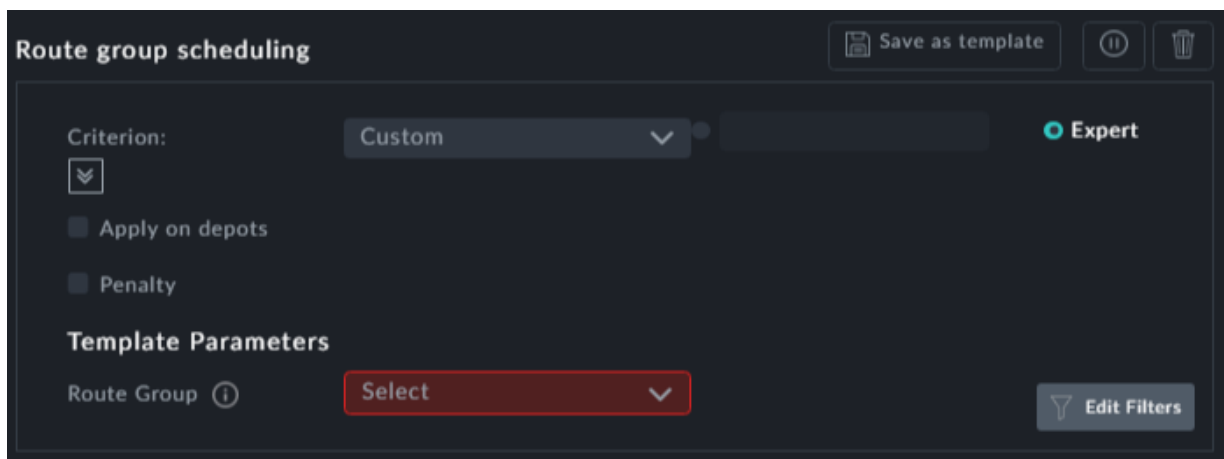
Purpose:

Apply homogeneity to a specific route group.

Prerequisites:

You should have already defined your route groups. See Miscellaneous Preferences, [Route Groups](#).

Opening Dialog:



The screenshot shows the 'Route group scheduling' dialog box. At the top, there is a title bar with the text 'Route group scheduling' and three buttons: 'Save as template', a pause button, and a trash icon. Below the title bar, the dialog is divided into several sections. The first section has a 'Criterion:' label, a dropdown menu set to 'Custom', and a radio button labeled 'Expert' which is currently selected. Below this, there are two checkboxes: 'Apply on depots' and 'Penalty', both of which are currently unchecked. The next section is titled 'Template Parameters'. It contains a label 'Route Group' followed by an information icon, a dropdown menu set to 'Select', and an 'Edit Filters' button with a funnel icon.

Points to note:

- » **Route Group:** This is a mandatory field
- » This preference may be strict or may be made flexible by assigning a penalty

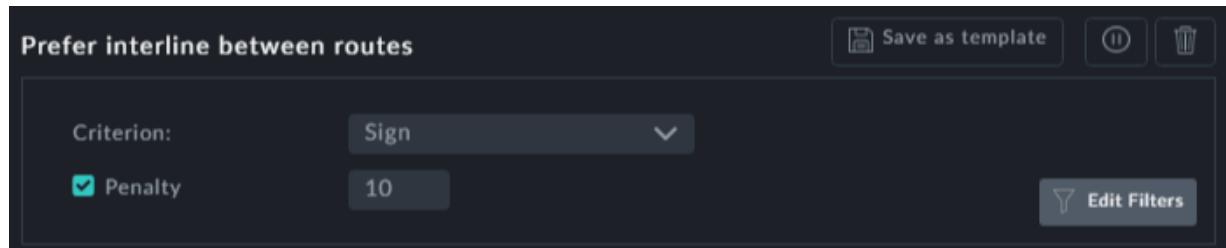
Prefer interline between routes

Purpose:

This preference is the opposite of homogeneity by any one of the criteria, Sign, Route, Region and Route Group.

Prerequisites: None.

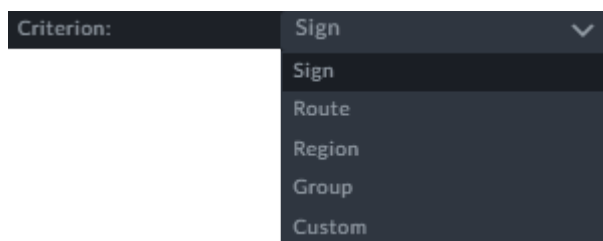
Opening Dialog:



The dialog box is titled "Prefer interline between routes". It features a dark background with light-colored text and controls. At the top right, there are three buttons: "Save as template" (with a floppy disk icon), a pause button (with a double vertical bar icon), and a delete button (with a trash can icon). The main content area contains a "Criterion:" label followed by a dropdown menu currently showing "Sign". Below this, there is a checked checkbox labeled "Penalty" followed by a text input field containing the number "10". At the bottom right of the main area is a button labeled "Edit Filters" with a funnel icon.

Points to note:

- » **Criterion:** The **Criterion** field opens a pick list:



This image shows the "Criterion:" label and an open pick list. The pick list is a vertical menu with a dark background and light text. It contains the following options: "Sign", "Route", "Region", "Group", and "Custom". The "Sign" option is currently selected and highlighted.

- » This preference sets a default penalty

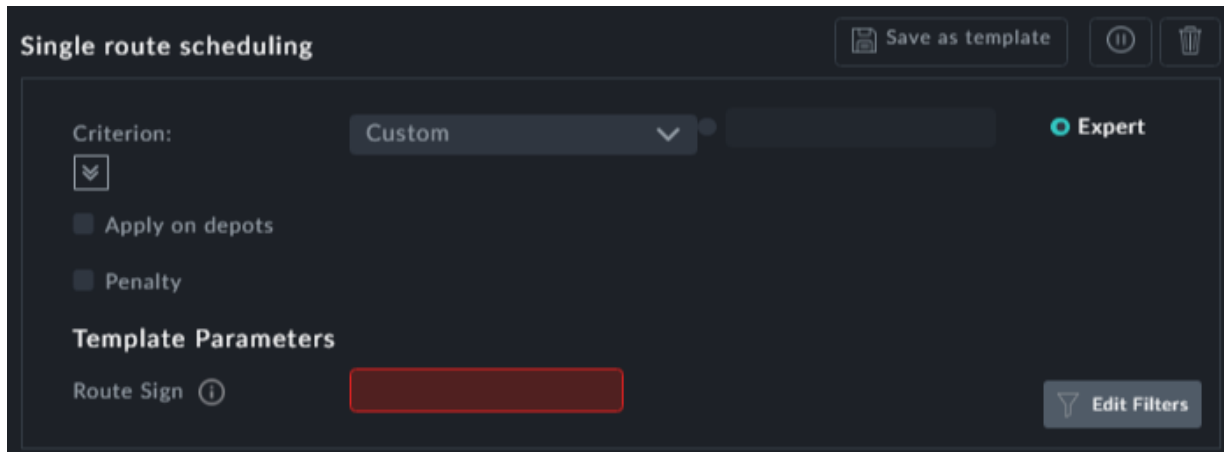
Single route scheduling

Purpose:

This preference applies homogeneity for a single sign or a comma separated list of signs.

Prerequisites: None.

Opening Dialog:



The screenshot shows a dark-themed dialog box titled "Single route scheduling". At the top right, there are three buttons: "Save as template" (with a floppy disk icon), a pause button (with a vertical bar icon), and a delete button (with a trash can icon). Below the title bar, on the left, is a "Criterion:" label next to a dropdown menu currently set to "Custom". To the right of the dropdown is a small circle and a teal "Expert" button. Below the dropdown is a small square icon with a downward arrow. Further down are two checkboxes: "Apply on depots" and "Penalty", both of which are currently unchecked. Below these is a section header "Template Parameters". Under this header, there is a label "Route Sign" followed by an information icon (i) and a red rectangular input field. At the bottom right of the dialog is a button labeled "Edit Filters" with a funnel icon.

Points to note:

- » **Route Sign:** This field is mandatory. It may be a single sign or a comma separated list of signs
- » This preference may be strict or may be made flexible by assigning a penalty

Prefer geographic round trip

Purpose:

This preference sets outbound and inbound trips together with the following relaxation: A trip will still be considered to be "inbound" for this purpose if its destination is within a given distance of the actual start location. A simple example of this is a vehicle leaving from Platform 1 of a large shopping center, but returning to Platform 20, 500 meters from its start location.

Prerequisites: Geographic data (GPS coordinates) for start-trip and end-trip locations must be stored in the schedule Dataset.

Opening Dialog:

Prefer geographic round trip

Save as template

Criterion: Custom

Apply on depots

Penalty 50

Template Parameters

Distance radius 2

Expert

Edit Filters

Points to note:

- » **Penalty:** The Penalty field is set to a default value.
- » **Distance radius:** This is the maximum distance within which we consider the trip start location and trip end locations to be "the same". In our example above, the actual distance was 0.5 km, considerably less than the 2km default shown.
This field is in Km (or miles, depending on your location) and is set to a default value.

Adjust deadheads to regulation

Purpose:

Create vehicles schedule so that deadheads conform with driver work regulations (see the **Work Limitation** preference).

Prerequisites: None.

Opening Dialog:

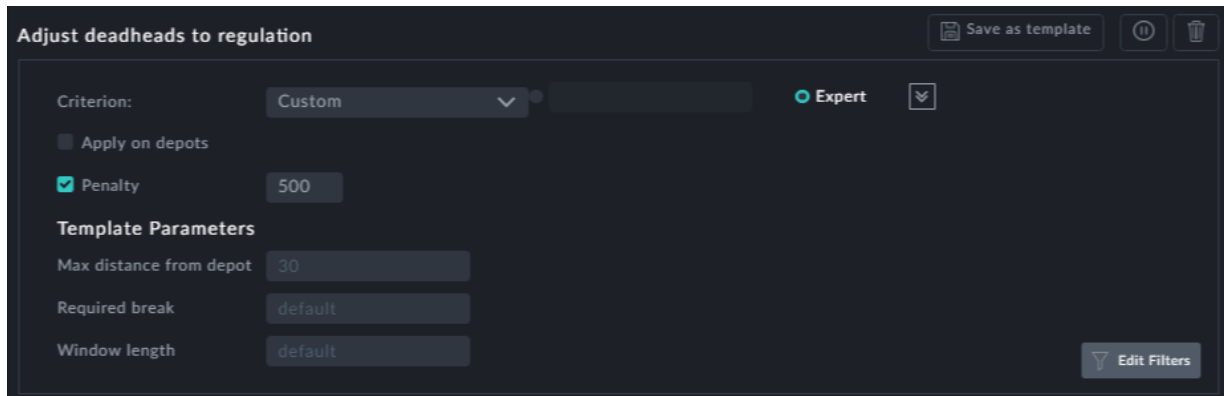


Figure 1-3: Adjusting deadheads to regulation

Points to note:

- » **Max distance from depot:** This is the maximum distance allowed for a deadhead back to the depot
- » The last two items relate to Drivers: **Work Limitations** as follows:
Recall the **BREAKS** section, which opens the following dialog:

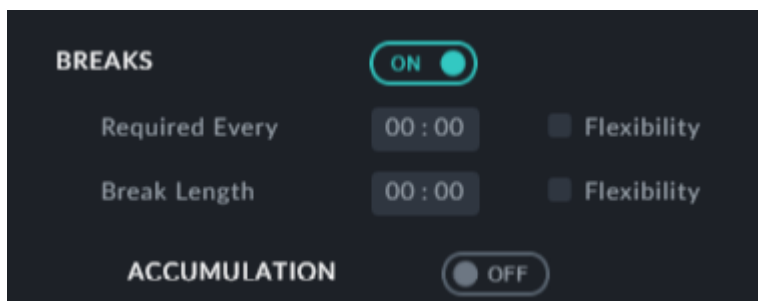


Figure 1-4: Extract from Work limitations

From **Figure 1-3**:

- » **Required break** defaults to the **Break length** in the Extract. You may make it longer.
- » **Window length** defaults to **Required Every** in the Extract. Leave it at default.
- » This preference may be strict or may be made flexible by assigning a penalty. It is best left as flexible with a high penalty as shown.

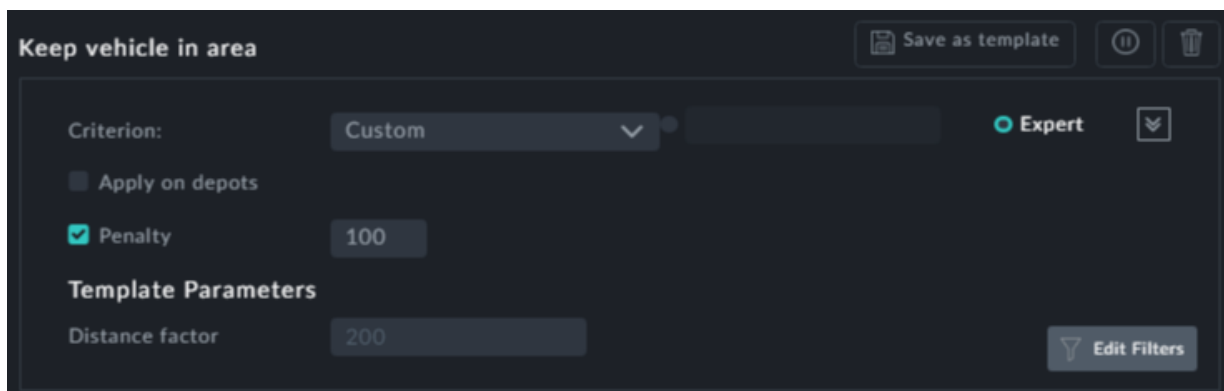
Keep vehicle in area

Purpose:

This preference is similar to **Minimize Vehicle Cruise Preference**. Here deadhead distance is minimized to prevent vehicles from doing trips that would take them too far from their "home" depot. Maximum deadhead distance from a depot is used as the homogeneity criterion.

Prerequisites: None.

Opening Dialog:



The screenshot shows a dark-themed dialog box titled "Keep vehicle in area". At the top right, there are three icons: a document with a plus sign labeled "Save as template", a pause icon, and a trash icon. The main content area has a "Criterion:" label followed by a dropdown menu set to "Custom". To the right of the dropdown is a radio button labeled "Expert" which is selected, and a small square icon with a downward arrow. Below this, there is a checkbox labeled "Apply on depots" which is unchecked. Further down, there is a checked checkbox labeled "Penalty" followed by a text input field containing the number "100". Below the "Penalty" section, there is a section header "Template Parameters". Under this header, there is a label "Distance factor" followed by a text input field containing the number "200". At the bottom right of the dialog, there is a button labeled "Edit Filters" with a funnel icon.

Points to note:

- » **Distance factor:** The distance from the vehicle's "home" depot should be realistically large enough, but the penalty for violation should also be realistically large.
- » This preference may be strict or may be made flexible by assigning a penalty as shown

Adjust depot pull in/out to regulation

Purpose:

This preference is similar to [Adjust deadheads to regulation](#). Recall that Pull in and Pull out are special deadheads.

Prerequisites: None.

Opening Dialog:

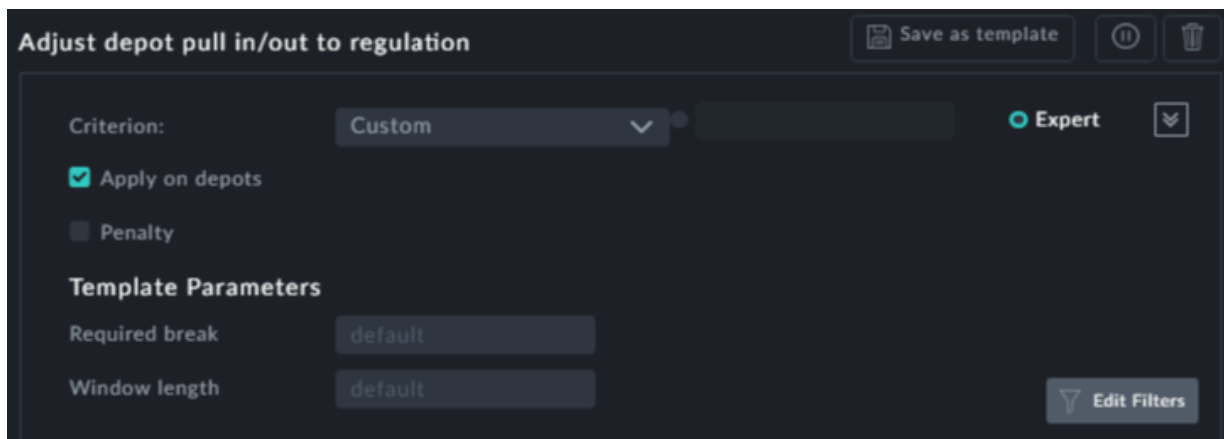
The screenshot shows a dark-themed dialog box titled "Adjust depot pull in/out to regulation". At the top right, there are three icons: "Save as template", a pause icon, and a trash icon. Below the title bar, there is a "Criterion:" dropdown menu set to "Custom", followed by a small circular slider and a green "Expert" button with a dropdown arrow. Underneath, there are two checkboxes: "Apply on depots" (checked) and "Penalty" (unchecked). A section titled "Template Parameters" contains two input fields: "Required break" and "Window length", both set to "default". At the bottom right, there is an "Edit Filters" button with a funnel icon.

Figure 1-5: Adjusting pull in/pull out

Points to note:

- » **Required break** and **Windows length** relate to Drivers: [Work Limitations](#) as follows:
Recall the **BREAKS** section, which opens the following dialog:

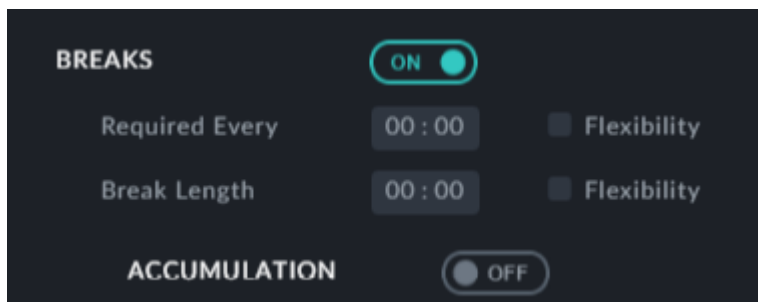
The screenshot shows a dark-themed dialog box with the title "BREAKS". At the top right, there is a toggle switch labeled "ON" which is currently turned on. Below this, there are two rows of settings. The first row has "Required Every" followed by a time input field set to "00 : 00" and a "Flexibility" checkbox which is unchecked. The second row has "Break Length" followed by a time input field set to "00 : 00" and a "Flexibility" checkbox which is unchecked. At the bottom, there is a section titled "ACCUMULATION" with a toggle switch labeled "OFF" which is currently turned off.

Figure 1-6: Extract from Work limitations

From [Figure 1-5](#):

- » **Required break** defaults to the **Break length** in the Extract. You may make it longer.
- » **Window length** defaults to **Required Every** in the Extract. Leave it at default.
- » This preference may be strict or may be made flexible by assigning a penalty