Optibus OnSchedule™

User Manual

Version 1.0.000

Notice

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Getting Started

Chapter 1: About this User Manual

Manual Structure

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Typographical Conventions

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Viewing and Printing

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Notifications

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Concepts and Terminology

Most of the terminology in this manual is industry standard, however Optibus OnSchedule™ introduces some application specific concepts. This section provides a description of these concepts and how they tie into standard terminology.

For our purposes, an **Operator** operates a fleet of road vehicles to provide public transportation services. The Operator carries out scheduling based on the following standard data sources:

- **Trips list**
- **Stops list**
- **Vehicle types list**
- **Deadheads catalog**

We introduce here, the notion of a **Dataset**. A Dataset is a database that takes in these four standard data files. An Operator may this way, have several Datasets for different purposes. Optibus OnSchedule™ creates the Datasets from the four files, which the Operator supplies in conjunction with Optibus. They may be supplied in a variety of formats including Excel spreadsheet, CSV and JSON. The content and layout of theses files is described in TBD.

Basic terms such as **Deadhead, Depot**, **Pull in**, **Pull out**, **Split**, **Changeover** are standard.

A **Route** is a very specific: It is specified by a **Sign**, an **Alternative** (often abbreviated to **Alt**) and a **Direction**.

Similarly, a **Service trip** is also defined in a very specific way: It includes route information, eligible vehicle types and start-end times. After scheduling, it will be assigned a driver duty and a vehicle.

You can open a schedule from a Dataset in one of three ways:

- You may choose one of list of existing schedules
- Import a schedule from a source spreadsheet
- Create a new schedule Using the Preferences and Optimization

The way in which the Optibus OnSchedule™ vehicle and driver displays are produced is largely dependent upon on the way in which the schedule was opened.

The vehicles are displayed in a **Vehicle Gantt** in which each **row** or **block** shows the trips allocated to a vehicle for a day's work.

A **vehicle block** does not relate to a specific physical vehicle. It shows the trips allocated for example, to vehicle 35 for the day. In that sense, vehicle ID 35 is an abstraction: It is a set of vehicle attributes that may be matched by one or more physical vehicles. Although Optibus OnSchedule™ takes into account fleet size, vehicle types and their attributes, the allocation of a specific physical vehicle to the a vehicle ID is outside the scope of the system.

The drivers are shown in a **Driver Gantt** in which each row shows the trips allocated to a specific driver for the day.

Drivers and Duties: In reality, Optibus OnSchedule™ deals with duties rather than with real drivers - personnel. The assignment of drivers to duties (dispatching) is outside the scope of Optibus OnSchedule™. Popular usage requires us to refer for example, to Vehicle Gantts and Driver Gantts rather than Duty Gantts.

First **optimization** is carried out by simply pressing the Optibize button. The processing time depends on the size of the schedule but is generally of the order of minutes.

Preferences for optimization: Optibus OnSchedule™ provides an extensive array of user preferences split into vehicle related, driver (duty) related, depot related and a miscellaneous section for everything else. The preferences reflect the diverse requirements of the industry, worldwide. New preferences are added from time to time in the wake of new customer requirements. These preferences affect the optimization outcome in a direct and visible way. Changing a preference generally requires re-optimizing

Strict and Flexible Preferences: A preference parameter can be entered as a **constraint**, being a fixed value or a fixed range of values. Optibus OnSchedule™ introduces something new: **Flexible preferences**. A value or range of values is still chosen but they are "elastic". However, there is a financial **penalty** for violating them.This leads to a more realistic optimization. Flexible preferences may be available for items not governed by legislation or regulation.

Chapter 2: Introduction

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Welcome

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Key Features

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Major Benefits

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Prerequisites

OptibusOnSchedule™ is a cloud hosted web service. It has no components installed on your computer. It is presently designed to run on the **Google Chrome** web browser.

Subsequent references to "browser" in this Manual, mean the Google Chrome browser unless otherwise stipulated. You can download the Google Chrome browser from the Google Chrome download site.

Other requirements are:

- Any operating system that can host the Google Chrome web browser (for example Windows, Linux, Unix, Mac TBD)
- Adequate memory - 4Gb recommended
- Fast processor - TBD
- Graphics accelerator card - TBD
- A large monitor: For production, at least 24". If possible, configure it as a secondary monitor dedicated to running OnSchedule™ in full screen mode.
- Laptop users: Use the best power mode possible - do not use power saving.

Tip: Wherever displays are larger than the viewing area, you can use the horizontal and vertical scroll bars in the usual way. If you are using a large screen, another way to show more in the browser display area is to use **Ctrl Minus** to decrease the text size.

Chapter 3: A Quick Tour of Optibus OnSchedule™

Objectives of this Tour

To use Optibus OnSchedule™ effectively, you must understand the work-flow for setting up and optimizing a schedule. This chapter takes you through the procedure without getting in to the profusion of available options and preferences along the way. These details are covered in **Choosing a Work Schedule** in the Technical Reference section.

The Tour has two objectives:

1. To introduce the main Optibus OnSchedule™ concepts and work-flow

2. To do an interface walk-through demonstrating the work-flow

The procedure has five main steps, covered in turn in the following sections:

1. Open your browser and log in to the Optibus OnSchedule™ web site

2. Create a new Dataset from the Trips Excel files

3. Open a schedule from the Dataset

4. Run the Optimizer for the first time to generate a Vehicle and Driver Gantt

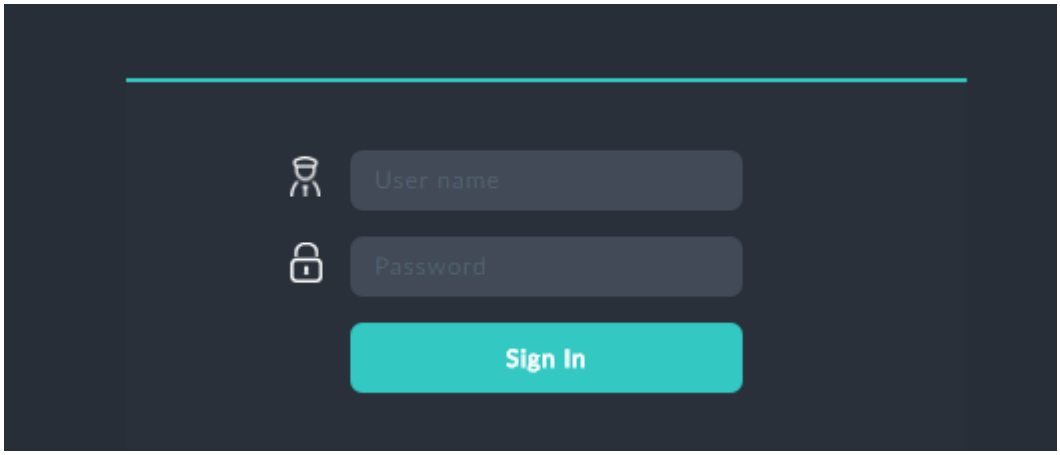
5. Use basic Preferences to complete the Gantts

The Tour is based on a weekly schedule. The demonstration below, starts with the optimization of a single day - Sunday.

Having completed this Tour, you will have the background necessary to proceed to the more advanced optimization techniques using the full Preferences facilities.

Logging in to Optibus OnSchedule™

The Web address (URL) of the OnSchedule™ demonstration is supplied by Optibus together with a user name and password. Open up your browser and navigate to it. You will see the log-in window:



Enter your user name and password and click on Sign In. An invalid user name or password will result in an appropriate error message.

Choosing a Dataset and Schedule

After you have logged in, you are presented a Dataset window:

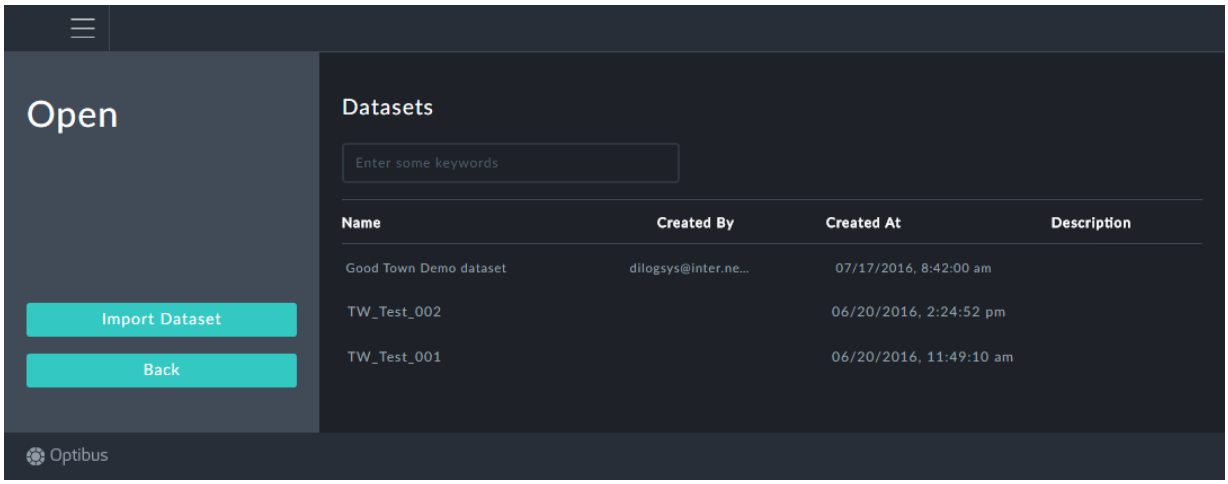


Figure 3-1: Choosing a Dataset

Click the Good Town Demo Dataset item in **Figure 3-1**. The Schedule selection window opens:

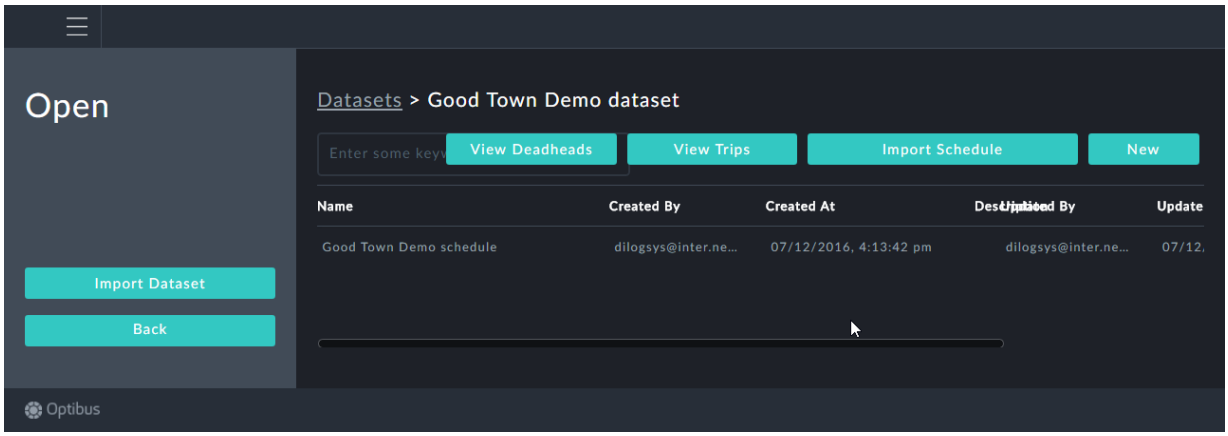


Figure 3-2: Choosing a Schedule

> **Note:** The Dataset and Schedule are imported from data supplied by the Operator. The methods for doing this are explained in **Preparing the Source Files for a Schedule**.

Click the Good Town Demo schedule item. After a few moments, the following window appears:

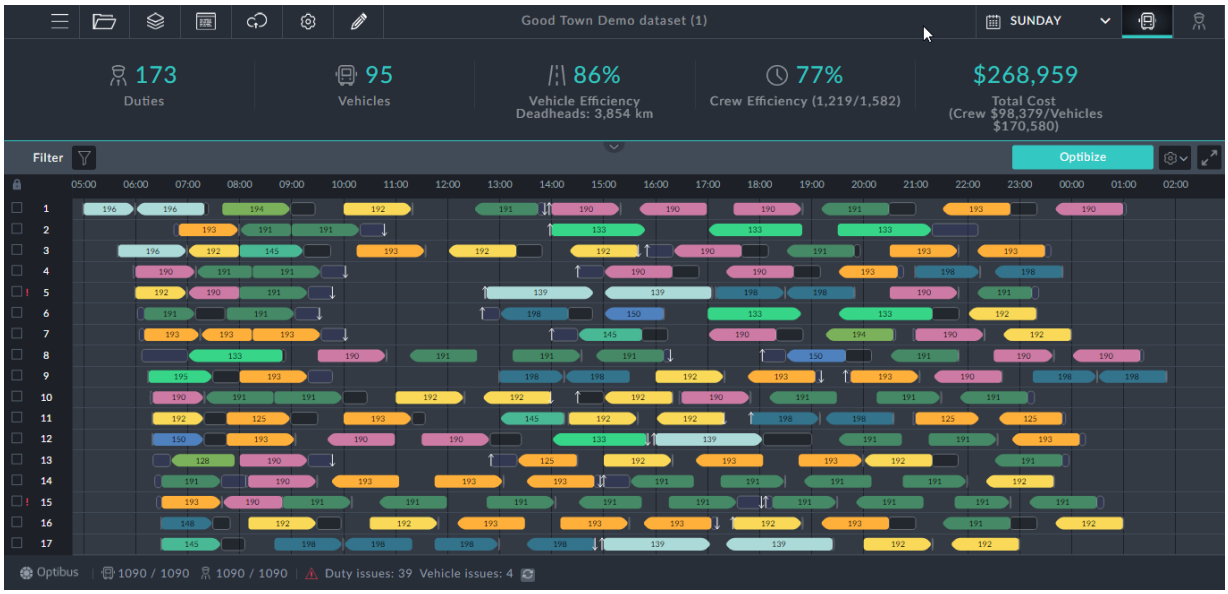


Figure 3-3: The Vehicle Gantt

A Quick Look at the Vehicle Gantt

In **Figure 3-3**, the shaded column rulers represents time and the rows represents vehicles (blocks).

The colors reflect the sign numbers. The coloring makes it very easy to get high level view of schedule quality, based on trip colors and gaps.

You can view detailed trip information by clicking a trip icon:

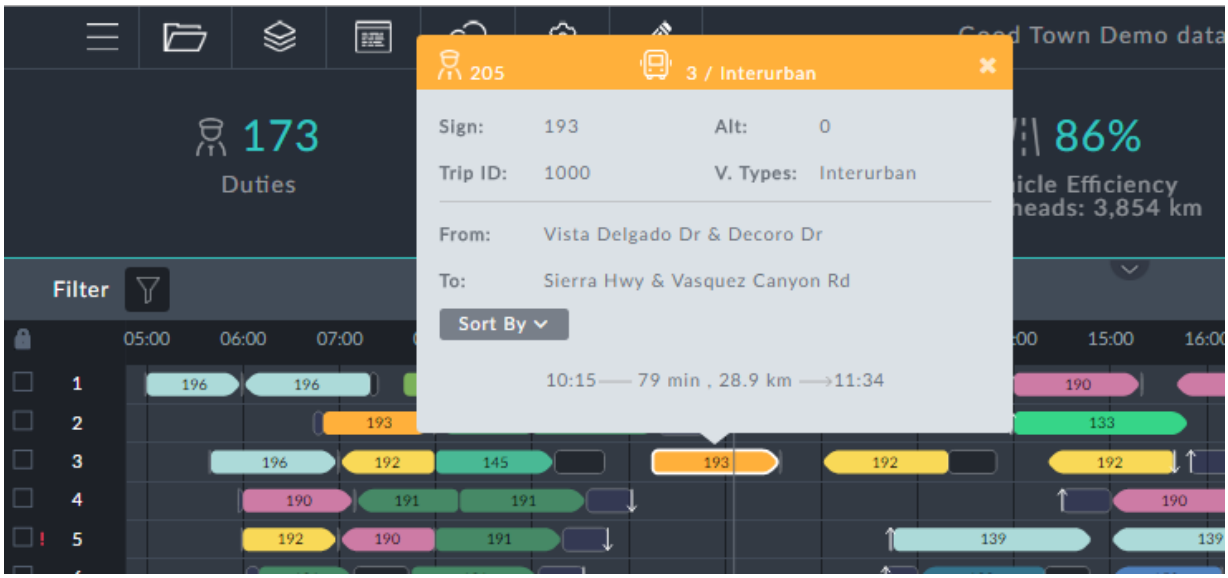
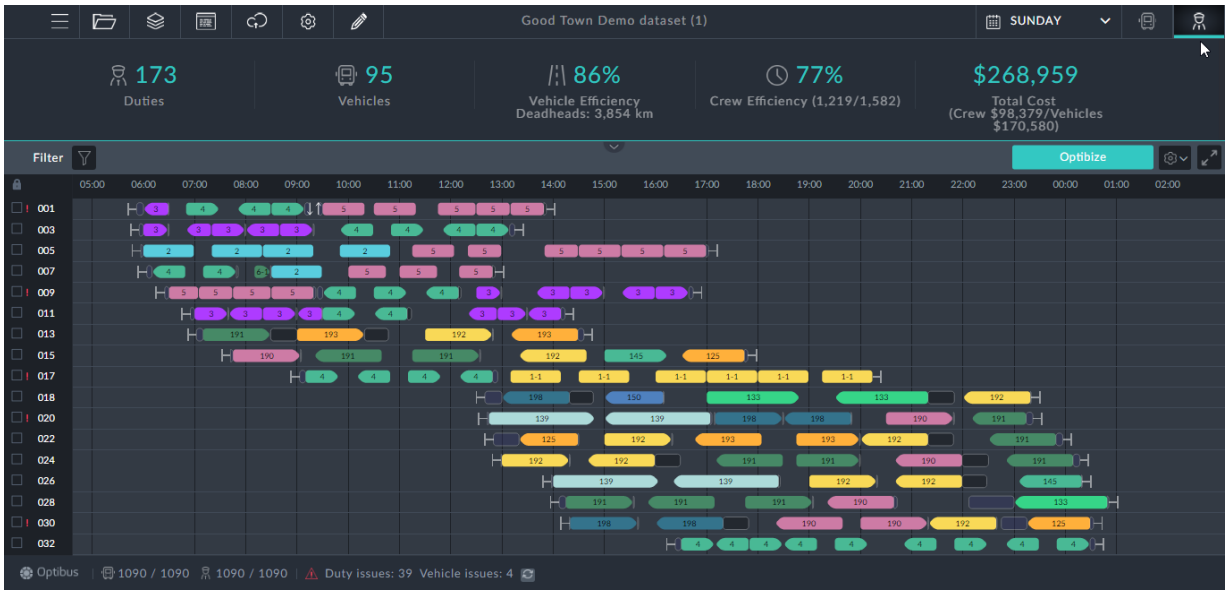


Figure 3-4: An exampl of trip details

In **Figure 3-4** we clicked the fourth trip (sign 193) for vehicle 3.

The Driver (Duties) Gantt

Click the driver button in the top right hand corner to see the Driver (Duties) Gantt:



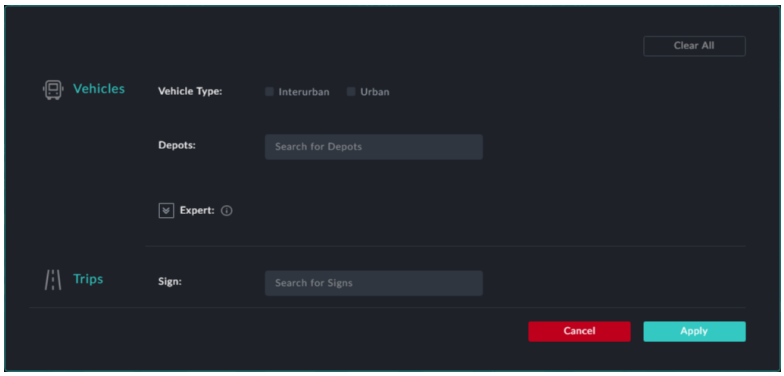
As for the Vehicle Gantt, in , the shaded column rulers represents time and the rows represents drivers (duties).

Figure 3-5: The Driver Gantt

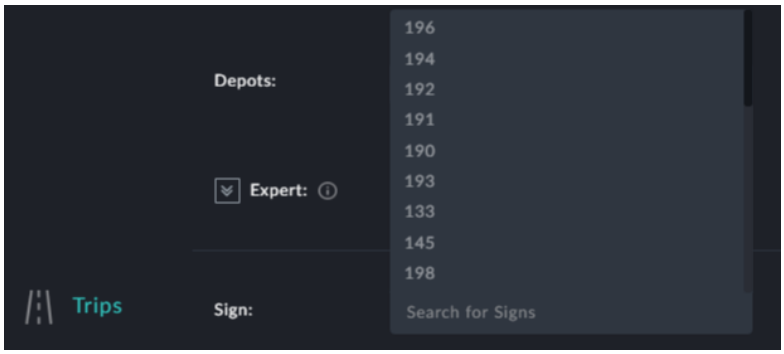
Again, the colors reflect the sign numbers.

Filtering the Gantt Views

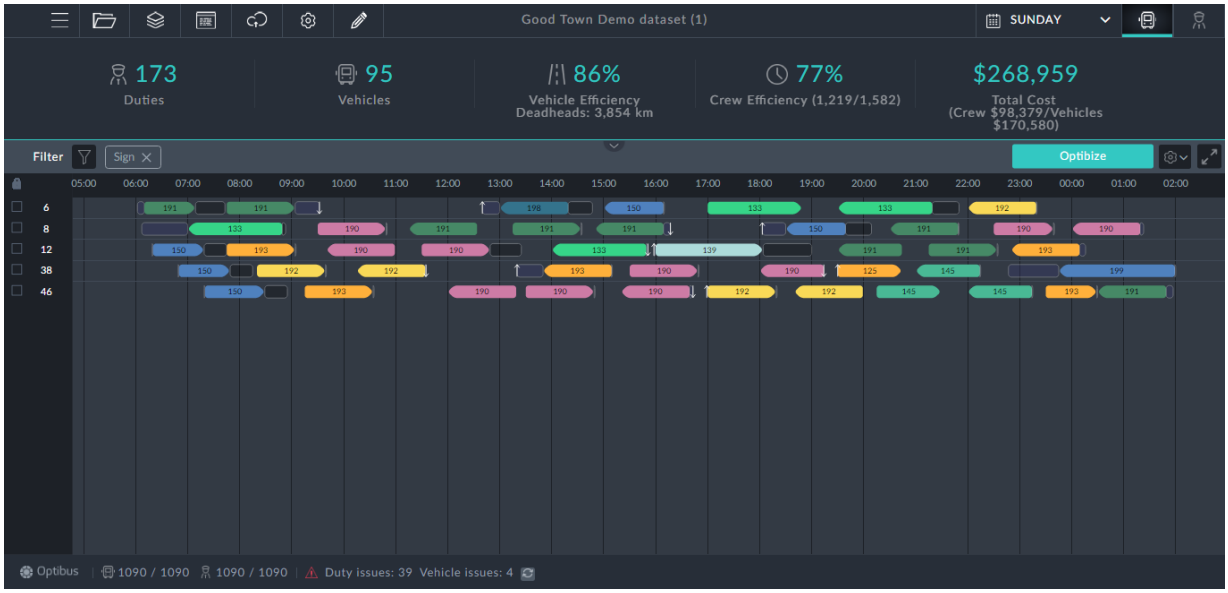
The two Gantts show an immense amount of information. You can use the Filter button to limit the view. Suppose for example, that we want to see blocks for sign 150. On the Vehicle Gantt, open the Filter:



In the Trips **Sign** field, click over the **Search for Signs** area. You are offered a list of available signs:

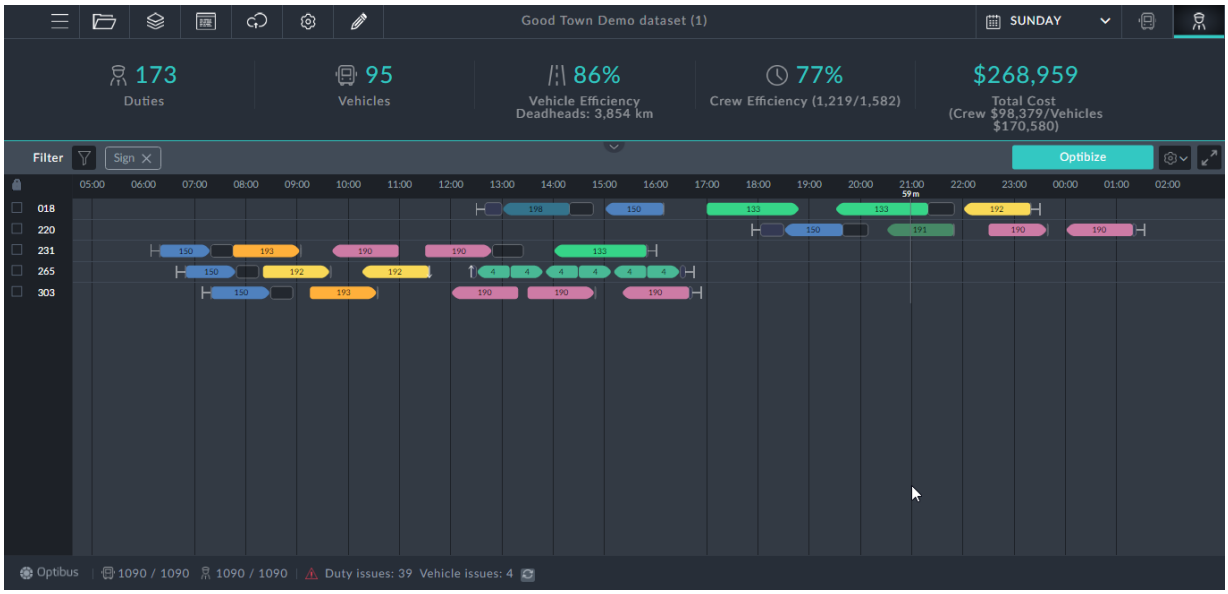


You may choose as many as you like (use the scroll bar to see more). We will choose sign 150 and click **Apply**. Here is the result:



The filter extracted all blocks including sign 150.

The choice of filters for the Driver Gantt is much more extensive, and we won't show the details here. However, if you again filter on sign 150, here is the result:



The filter extracted all drivers (duties) including sign 150 during the working day.

Key Performance Indicators (KPIs)

The top part of the display in **Figure 3-3** shows some of the KPIs. You can see all of them by clicking the button:

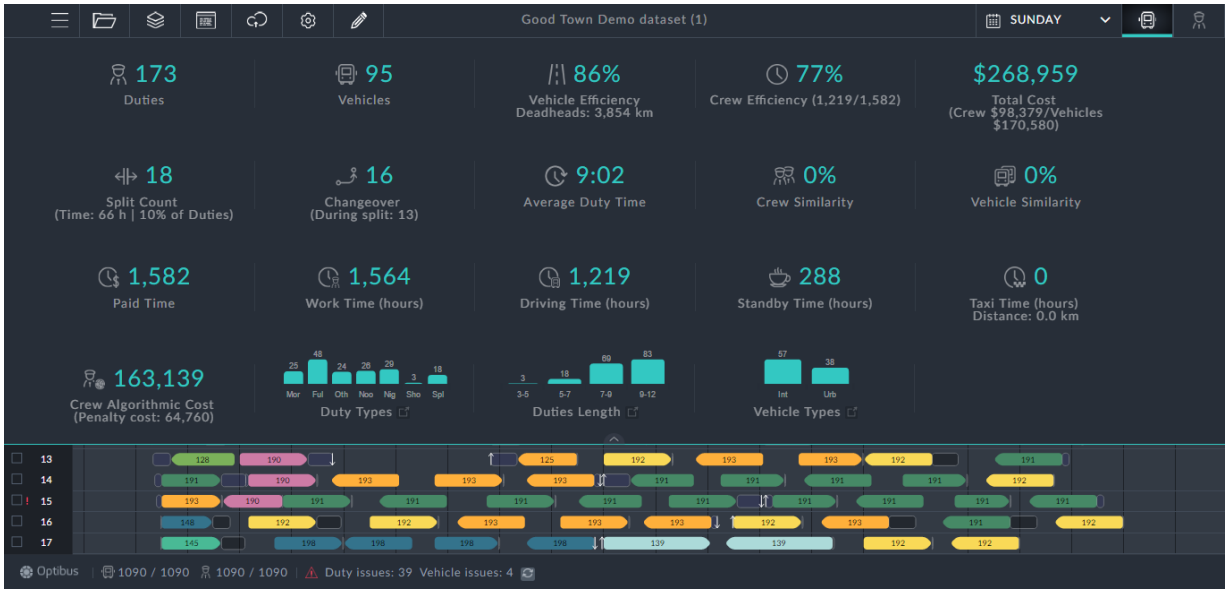


Figure 3-6: Full KPIs before optimization

The KPIs are based on the active schedule. They provide objective measures of performance for the schedule. They will change, when for example, you:

- Optimize the schedule
- Make manual changes and re-optimize

We will illustrate each of these cases in the following sections.

First Optimization

The first optimization is very simple: On the main window, click the Optibize button, and wait! The most obvious changes will be in the KPIs.

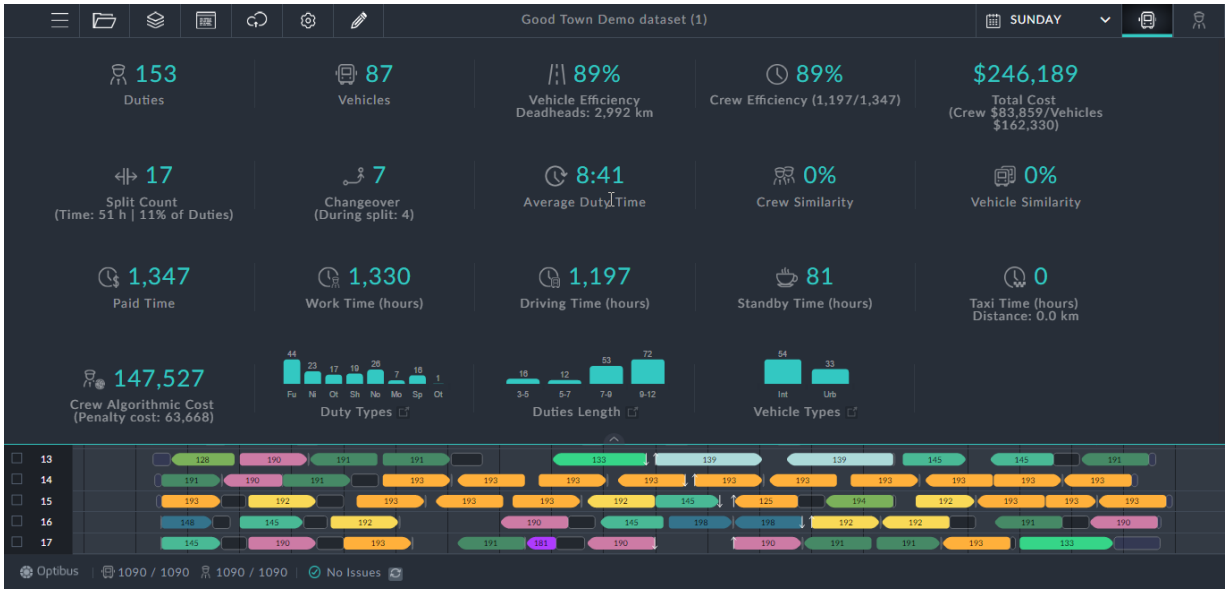


Figure 3-7: Full KPIs after optimization

Here is a convenient summary:

Table 3-1: KPI Partial Comparison - pre and post optimization

KPI	Pre Optimization	Post Optimization	Improvement
Duties	173	153	Down 20
Vehicles	95	87	Down 8
Vehicle Efficiency	86%	89%	Up 3%
Crew Efficiency	77%	89%	Up 12%
Total Cost	$268,959	$246,189	$22,770
Split Count	18	17	Down 1
Changeover	16	7	Down 9
Average Duty Time	9hr 2min	8hr 41min	Down 21min

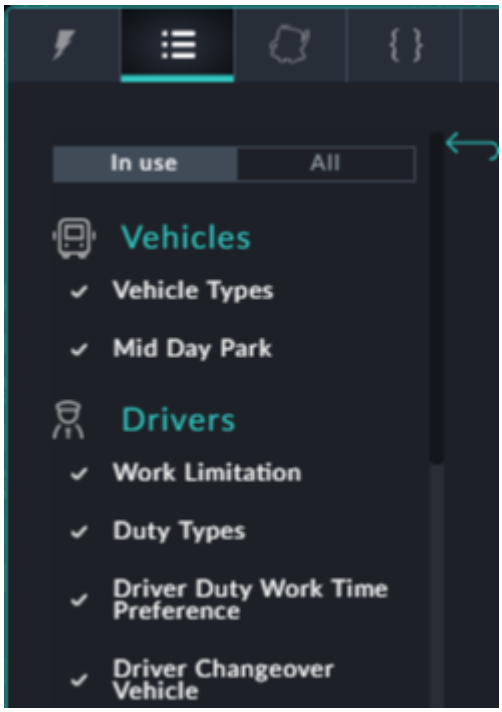
KPI	Pre Optimization	Post Optimization	Improvement
Paid Time	1582	1347	Down 235
Work Time	1564	1330	Down 234
Driving Time	1219	1197	Down 22
Standby Time	288	81	Down 207

Using Preferences to Optimize the Schedule

Driver Work Limitations

We will evaluate the cost and other implications of changing driver break conditions.

In the main window, click to open Preferences.



Under **Drivers**, open **Work Limitation**. Turn on the Breaks preference and add as an example, 1 hour of break time for every 5 work hours, as shown:

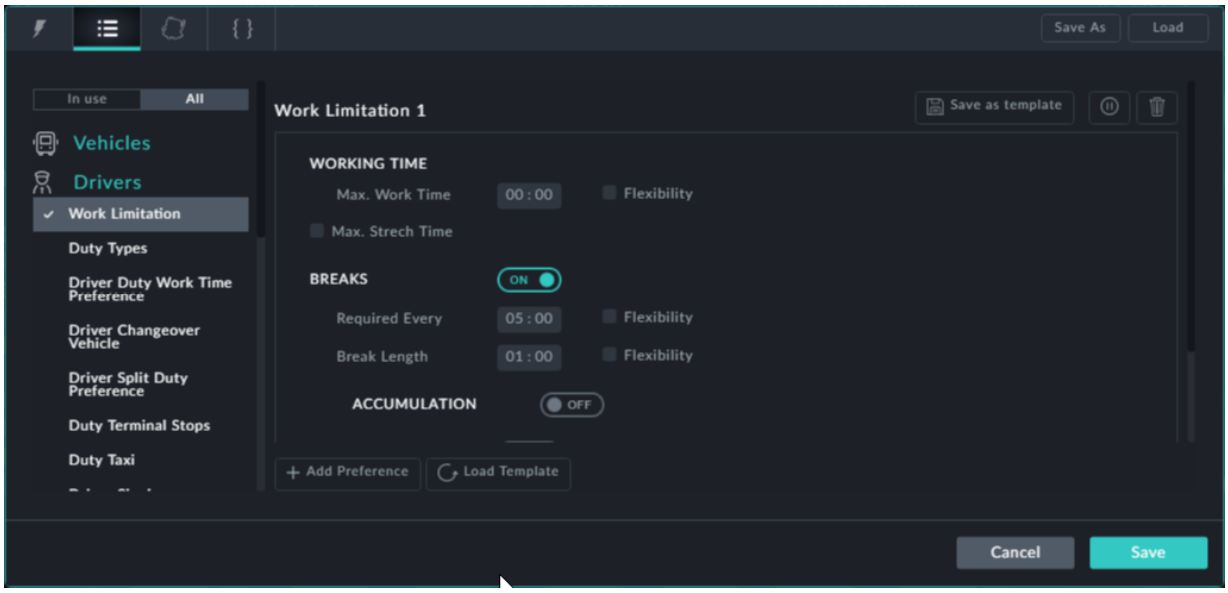


Figure 3-8: Preferences: Work Limitation

Click **Save**, and then Optibize. The main differences are, the number of Duties has risen from 153 to 159 and the Total Cost has gone up from $22,770 to $255,023.

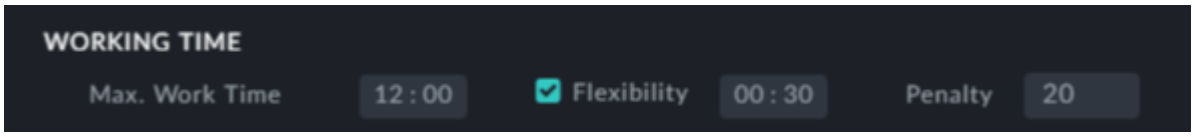
Further, look at the Drivers Gantt, a segment of which is shown in **Figure 3-9** below:

Figure 3-9: Driver Gantt optimized with Work Limitations

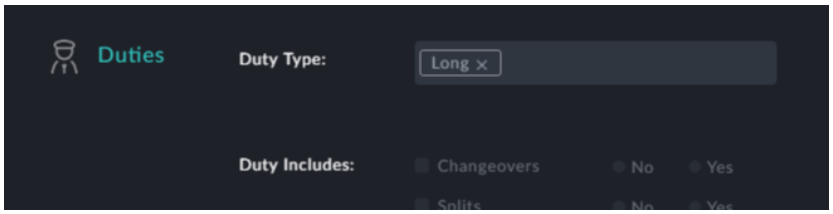
Observe that:

- Each duty has a 1 hour break after 5 hours
- No duty is over 12 hours

We can add flexibility to this strict arrangement by allowing violation of these rules subject to penalties. Again, open **Preferences** and **Work Limitation** (**Figure 3-8**). In the Max. Work Time row, check box next to Flexibility. Change the Flexibility time to 30 min and the penalty to 20 as shown:



Again, **Save** and then Optibize. To see the effect of our change, go to the Driver Gantt, open the Filter and choose Duties. Set **Duty Type** to Long as shown:



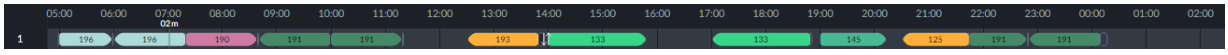
Now inspect the Driver Gantt again:

Opening any duty information box shows that the Long duties are all between 12 and 12.5 hours.

Block Homogeneity

We next consider the cost of maintaining a homogeneous vehicle schedule.

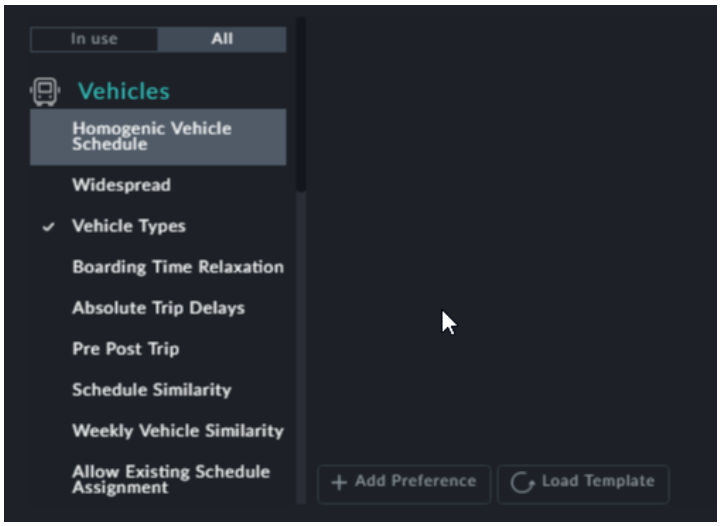
Looking at the optimized Vehicle Gantt, you can see that vehicle 1 for example, has a variety of routes:



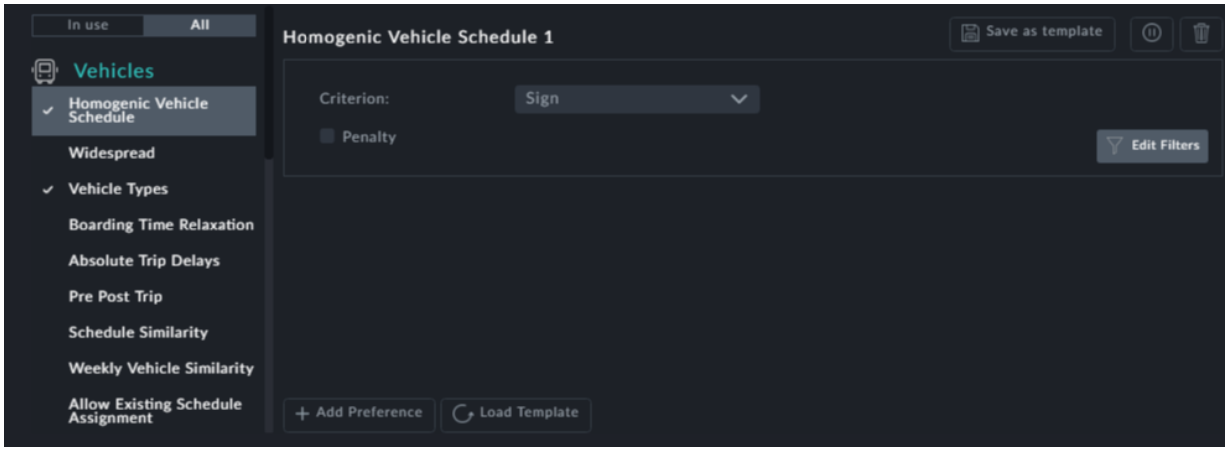
This presents problems for drivers, it is a cause of delays and is generally difficult to operate. How much does it cost to make the Vehicle schedule homogeneous?

We use the Preferences again to try a "What if?" exercise. What is the effect of making urban trips sign homogeneous?

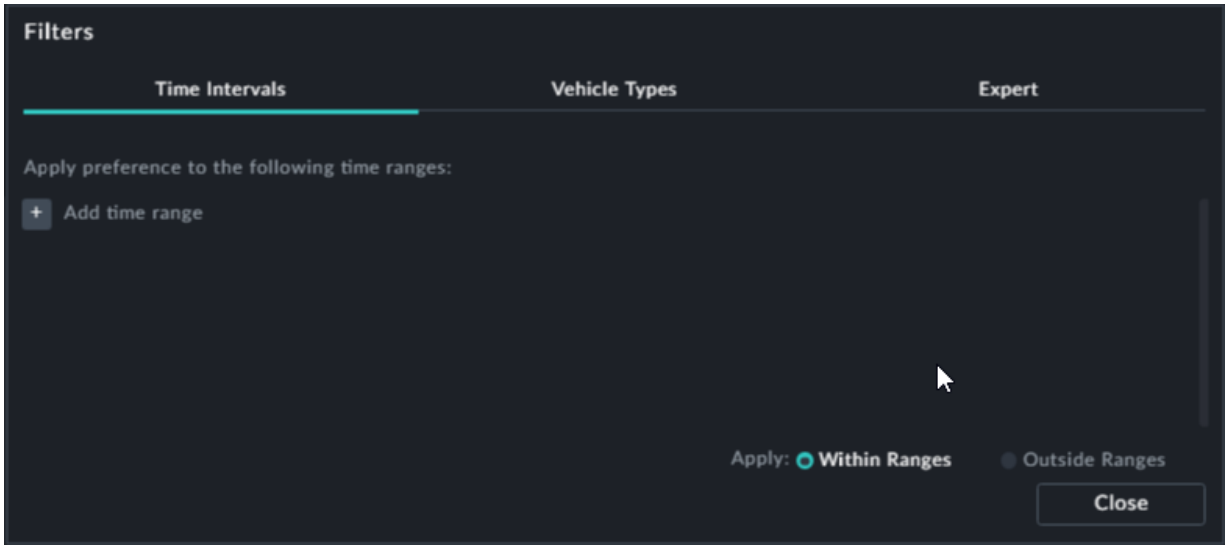
Starting with the original first-optimized schedules, we open Preferences, choose the **All** view and then **Homogenic Vehicle Schedule**. The following is displayed:



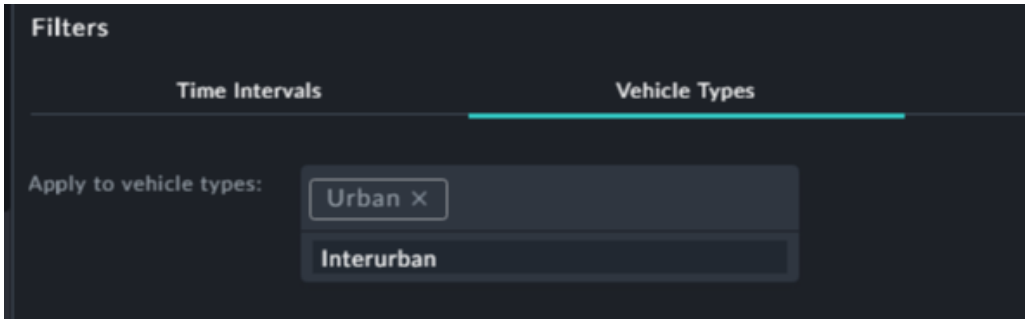
Click **Add Preference**. The following is displayed:



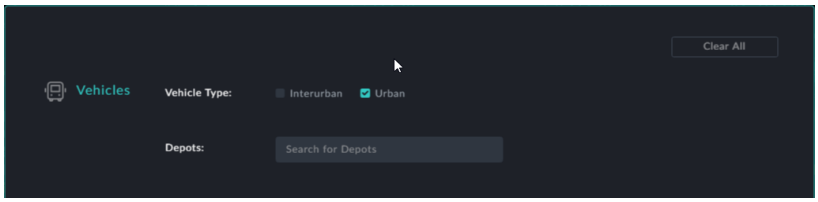
Leave the **Criterion** as Sign and click the **Edit Filters** button. The center part of the display changes as follows:



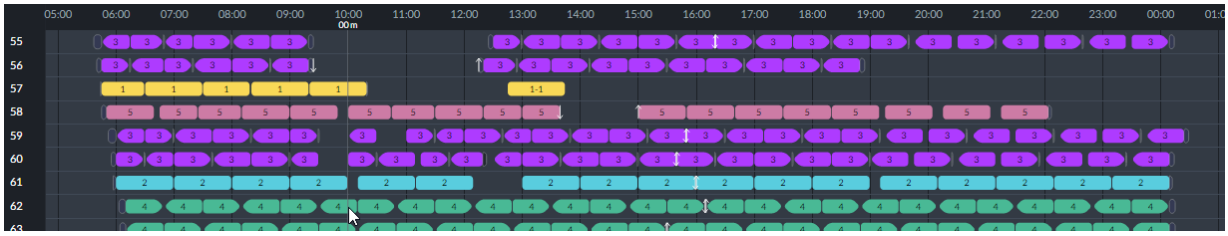
You can apply the preference to within a time range or outside it and you can restrict it to one or more vehicle types. You can also use **Expert** mode to create a custom filter. For our purposes, click Vehicle Type and chose **Urban**.



Click the **Close** button, and then click the **Save** button at the bottom right of the Preference window. Click Optibize . Filter the Vehicle Gantt for Urban vehicles:



We see that the Urban vehicles are sign-homogenic:



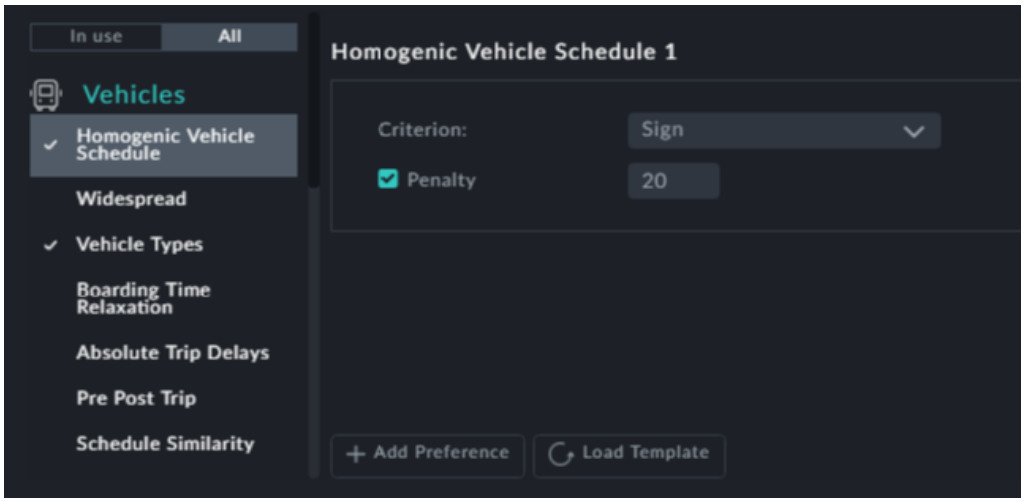
It is instructive to compare some of the KPIs before and after the change:

Table 3-1: KPI Partial Comparison - pre and post optimization

KPI	Pre Optimization	Post Optimization
Duties	153	152
Vehicles	87	91
Total Cost	$246,189	$248,802

Notice that the number of vehicles has increased along with the Total Cost.

Let us next try a near-homogenic schedule: We prefer that vehicles have a single route but some may have more than one if there is a cost saving. We can achieve this by using a penalty of 20 instead of a constraint:



Here is part of the Vehicle Gantt:

Notice that Vehicles 65 and 71 have two routes.

Finally notice the changes in the KPIs:

Table 3-2: KPI Partial Comparison - pre and post optimization

KPI	Pre Optimization	Post Optimization - Strict Homo-geneity	Post Optimization - Flexible Homo-geneity
Duties	153	152	152
Vehicles	87	91	87
Total Cost	$246,189	$248,802	$246,285

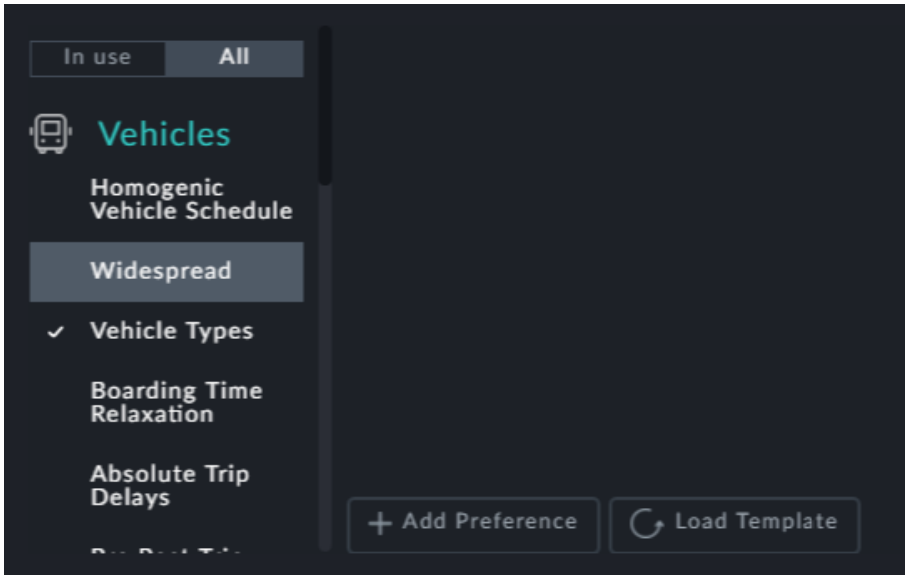
The Total Cost and the number of vehicles have dropped from the strict homogenic case. The outcome is better than strict homogeneity.

Widespread

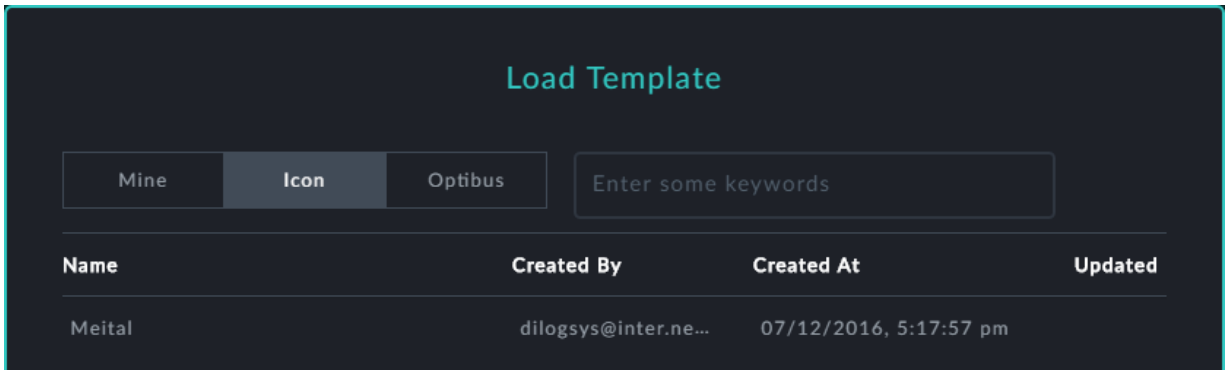
What if we generate breaks between trips, and how much will it cost?

First, observe that in our basic Driver Gantt of **Figure 3-5** the break between trips are very short. We will add a widespread of 15 minutes.

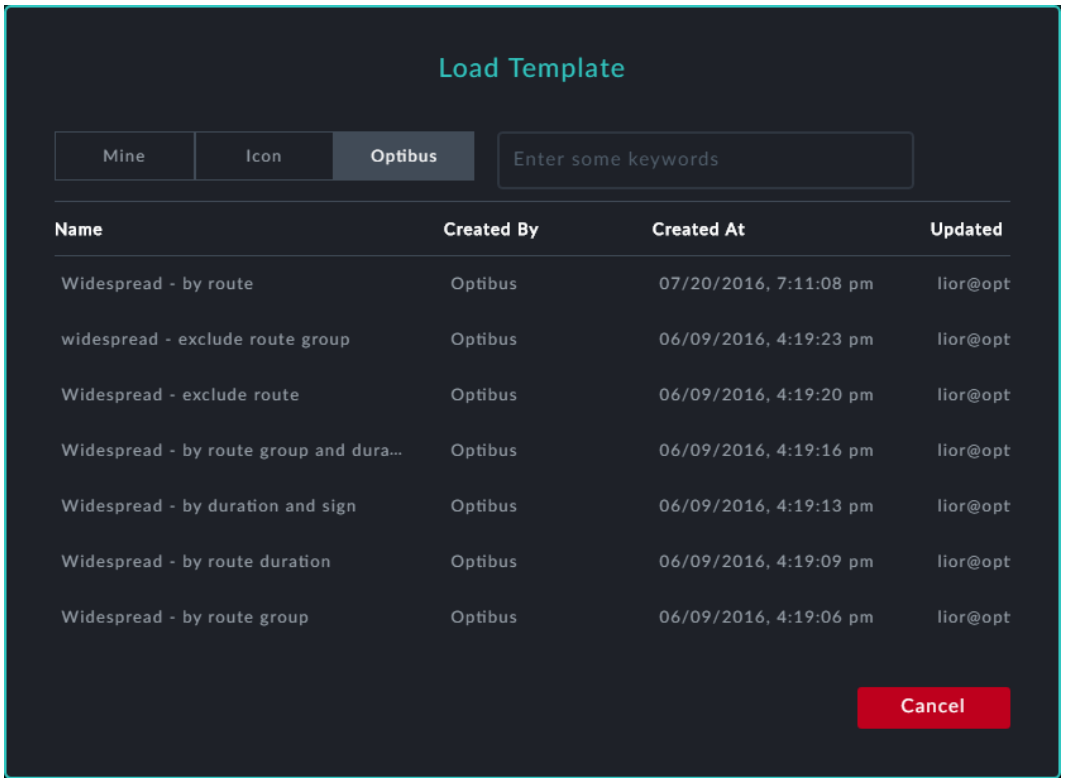
In Preferences, set **All**, go to **Vehicles** and choose **Widespread**:



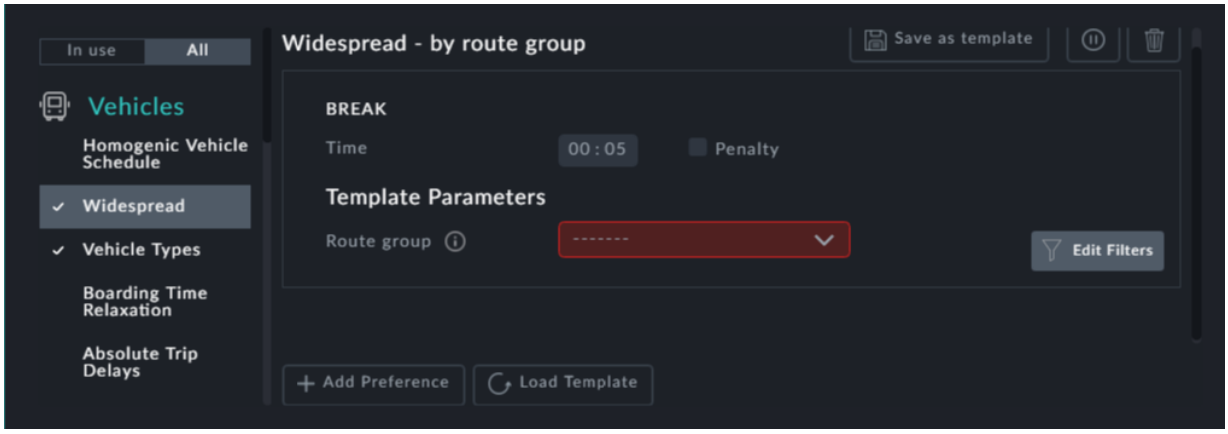
We will use a pre-supplied Template. Click **Load Template**:



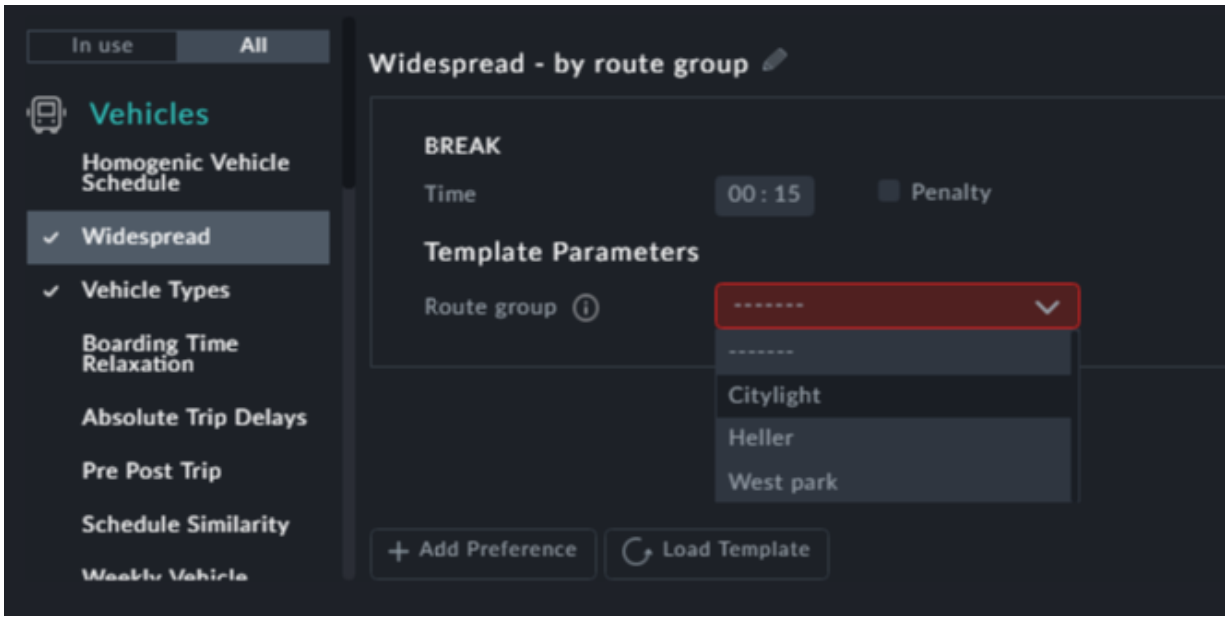
We will use an Optibus supplied template. Click the Optibus button:



Choose **Widespread by route group**:

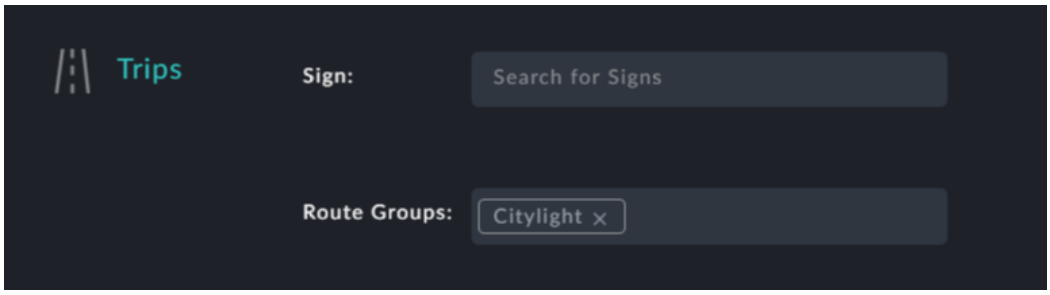


Change the Time to 15 minutes. Click Route group and choose **Citylight** as shown:

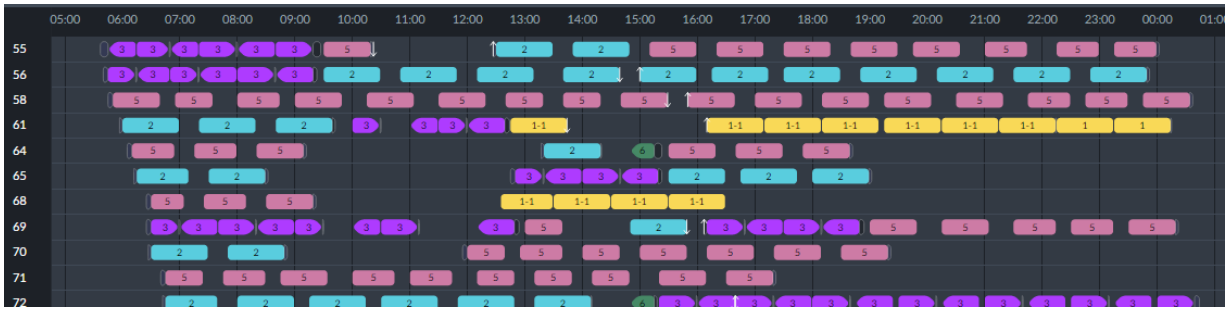


As usual, save and optimize.

The Citylight route group contains routes 2 and 5. Now, filter the Vehicle Gantt to the Citylight route group:



Click **Apply**. Here is the outcome:



Notice that trips with signs 2 and 5 have a widespread of 15 minutes.

Finally, here are the changes to the KPIs:

Table 3-3: KPI Partial Comparison - pre and post optimization

KPI	Pre Optimization	Post Optimization - Wide-spread
Duties	153	158
Vehicles	87	91
Total Cost	$246,189	$251,398

As to be expected, forcing a Widespread of 15 minutes has increased the number of Duties, Vehicles and the Total Cost.

Depots

We next examine the financial effect of adding another depot.

You can change a depot or add a new depot. You can also define a global vehicle capacity or capacity per vehicle type. We will reduce the capacity of the one exciting depot and add a new depot.

In Preferences, set **All** and choose **Depots** and **Depot Capacity**.

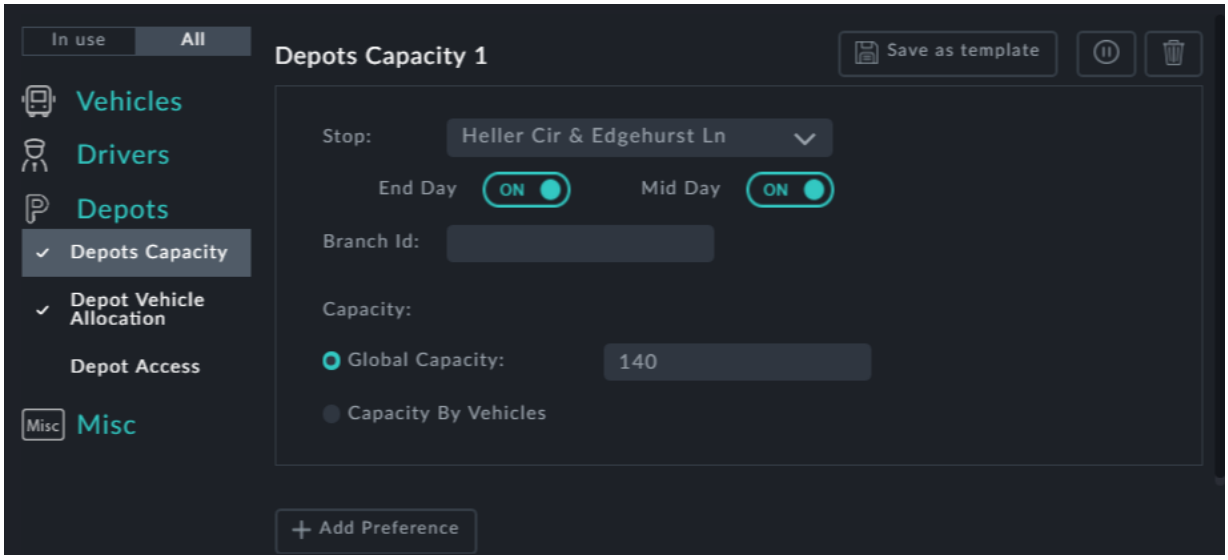
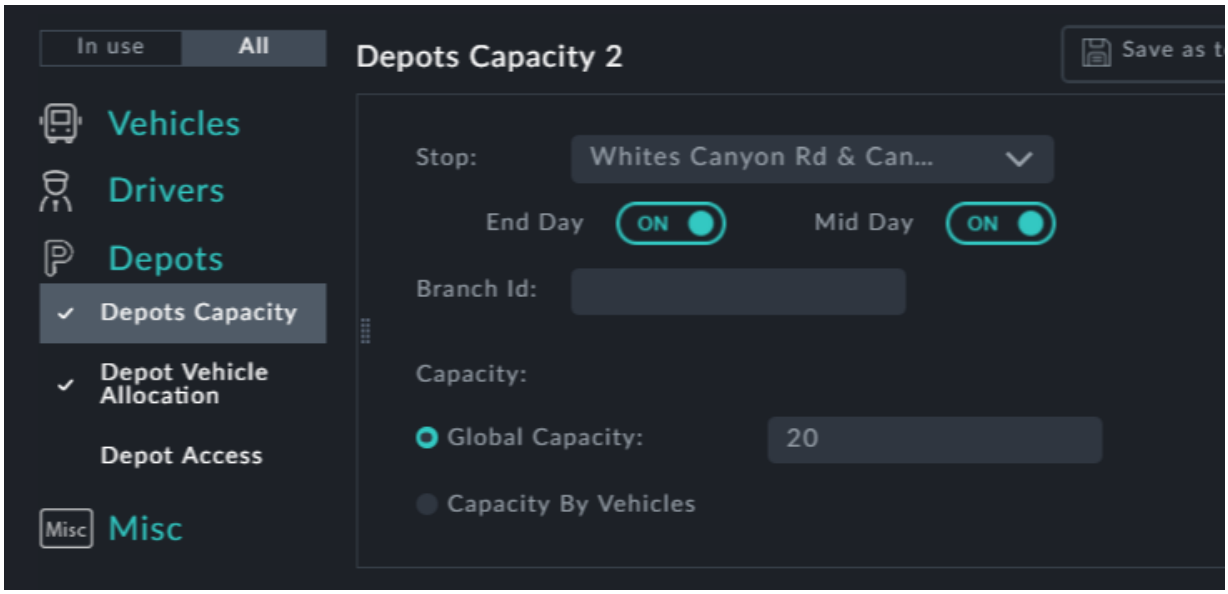
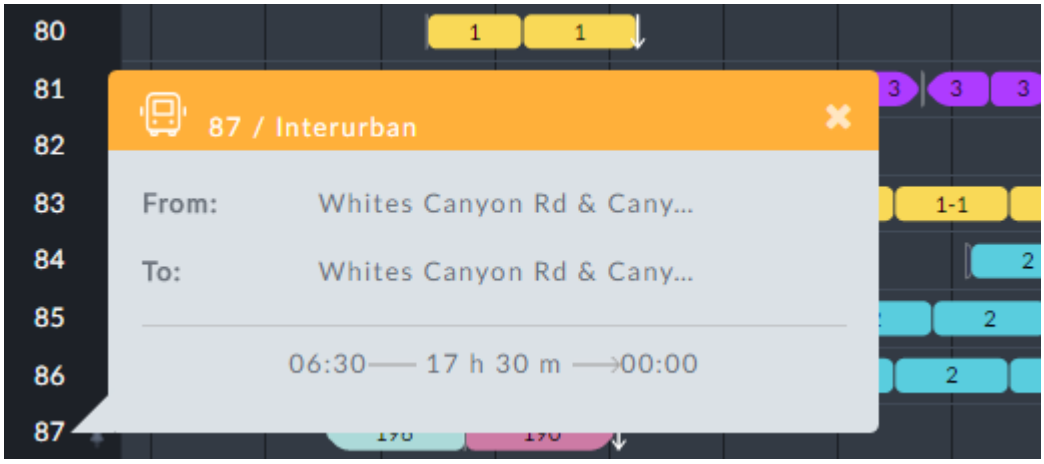


Figure 3-10: The original single depot

Change the Global Capacity from 140 t 100 and click **Add Preference**. Change the **Stop** to the last stop in the drop down list as shown, and change the Global Capacity to 20:



Save and optimize. In the Vehicle Gantt, we see that only the last vehicle uses the new depot. You can check that all of the blocks up to and including 86, terminate at the original depot shown in **Figure 3-10**. Block 87 terminates at the new depot:



Here are the changes to the KPIs:

Table 3-4: KPI Partial Comparison - pre and post optimization

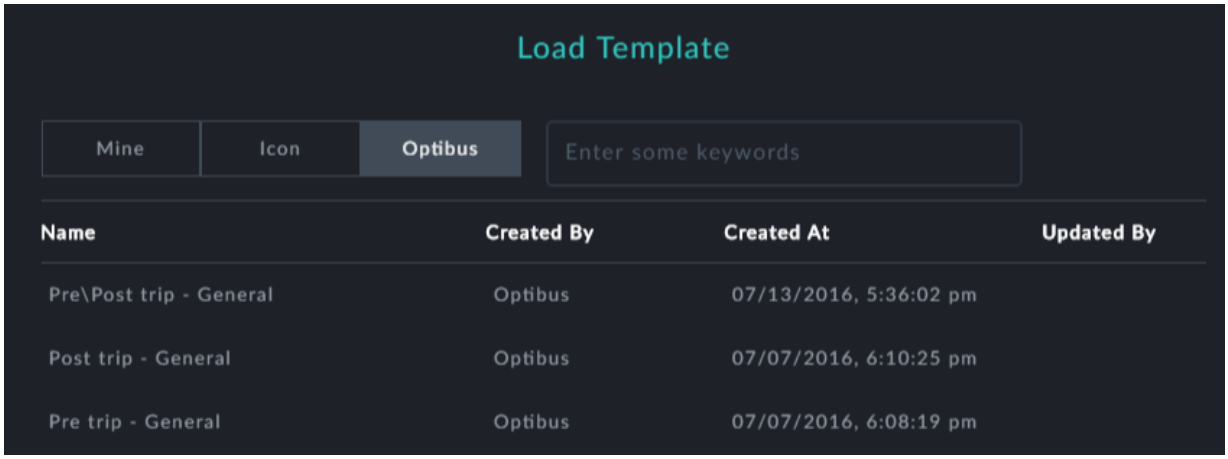
KPI	Pre Optimization	Post Optimization - New Depot
Duties	153	154
Vehicles	87	87
Total Cost	$246,189	$243,439

Adding Pre Trip and Post trip Elements

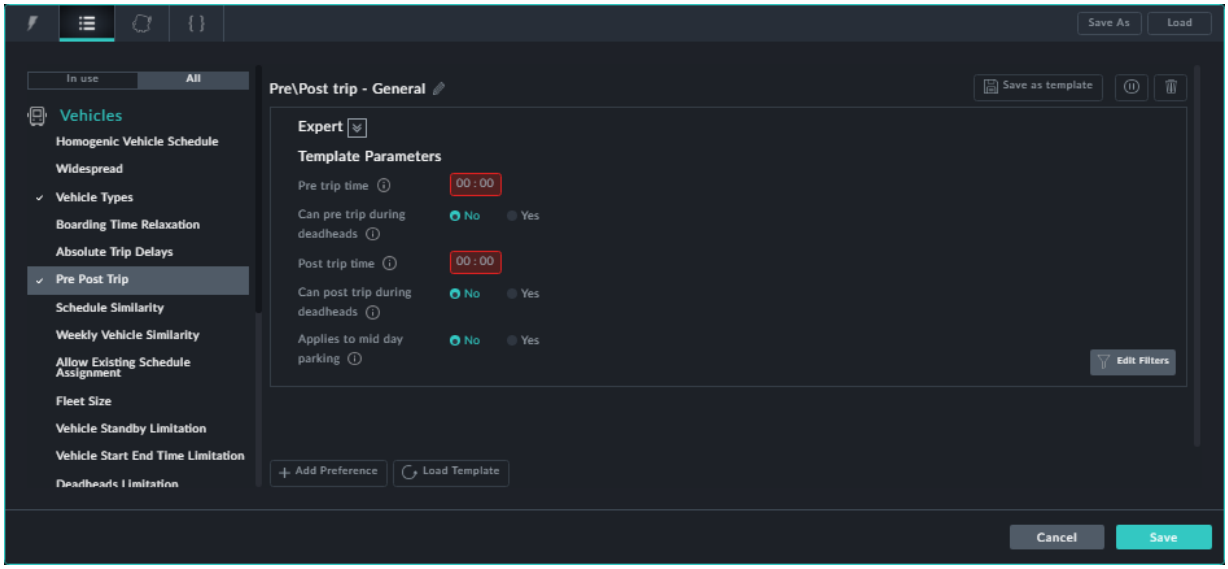
Pre and Post trip elements are used for vehicle preparation and end of day stand-down.

In the Gantts of **Figure 3-3** and **Figure 3-5** there is no provision for Pre trip and Post trip activity. We can add them using the Preferences.

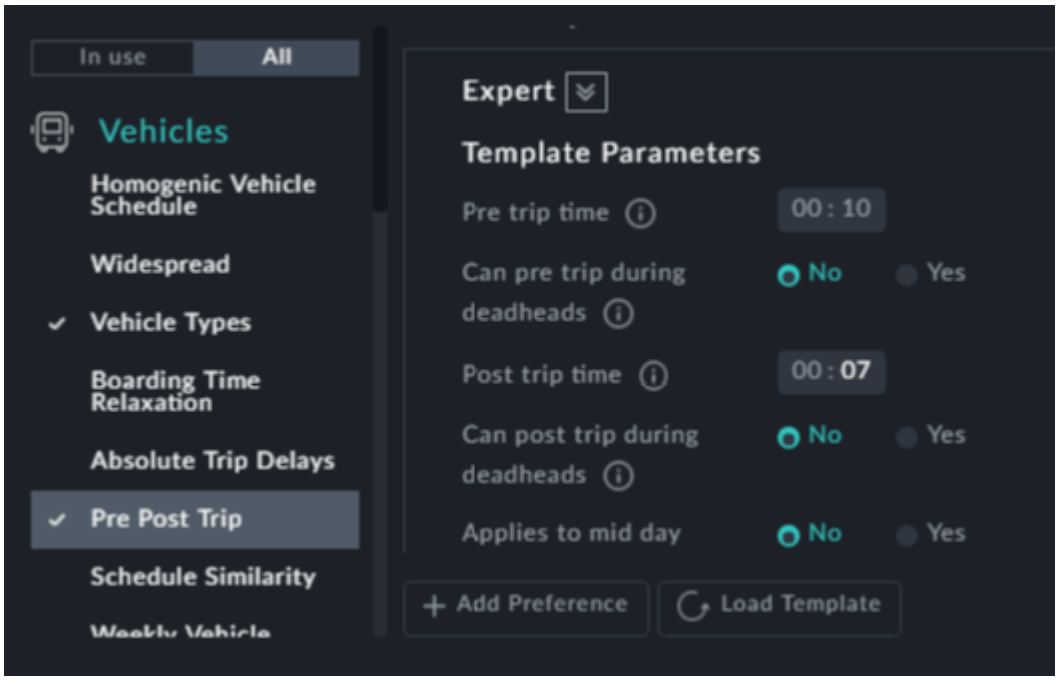
Open the Preferences, set **All.** Under Vehicles, choose **Pre Post Trip** and **Load Template**. Under the Optibus tab, choose, **Pre\Post trip - General**.



The template data entry form is displayed:

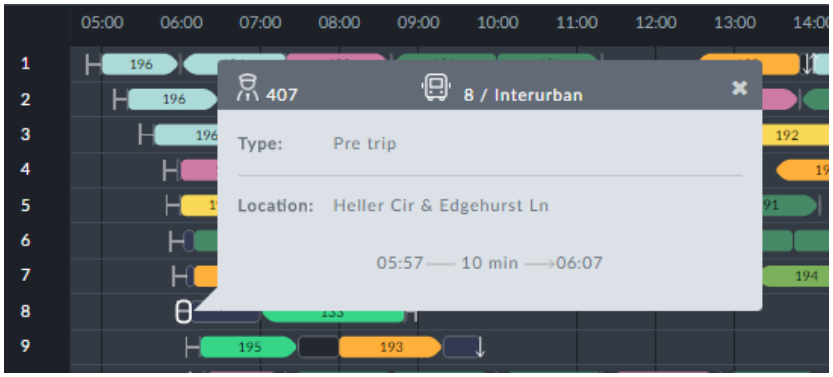


Set the Pre trip time to 10 minutes, the Post trip time to 7 minutes and leave all of the other items as is.



Save and optimize. Here for example is part of the Vehicle Gantt:

Confirm by opening a Pre trip information box:



The Pre trip is 10 minutes as expected.

Here is part of the Driver Gantt:

TBD - Replace, this is buggy.

Here are the changes in the KPIs:

Table 3-5: KPI Partial Comparison - pre and post optimization

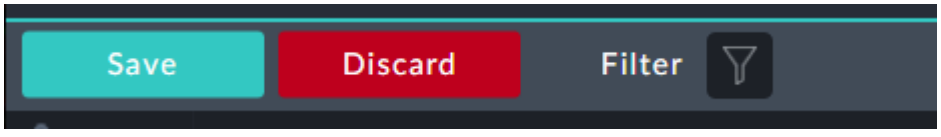
KPI	Pre Optimization	Post Optimization - Add Pre/Post Trip
Duties	153	156
Vehicles	87	87
Work Time	1330	1355
Total Cost	$246,189	$247,922

The addition of the Pre and Post trips adds 17 minutes per vehicle to the worktime, increasing the Total Cost. It also creates the need for additional Duties.

Manual Editing

Schedule changes occur during the work day. Keeping the schedule up to date is essential to maintain its quality and cost effectiveness. To accomplish this, Optibus OnSchedule™ provides a manual editing facility. In addition, the manual editing facility enables you to fine-tune the schedule.

Tip: In all of the previous example, you will have noticed that there is an option to save or discard your changes.



The same applies to manual editing. Until you feel comfortable using manual editing, we suggest that you start by backing up your existing schedule using **Save As** from the Context Menu.

Here is a demonstration of what you can achieve using manual editing.

Display the Driver Gantt. To enter Manual Editing mode, click the Manual Edit button in the top toolbar. An editing area called the **Stack**, opens above the regular Gantt:

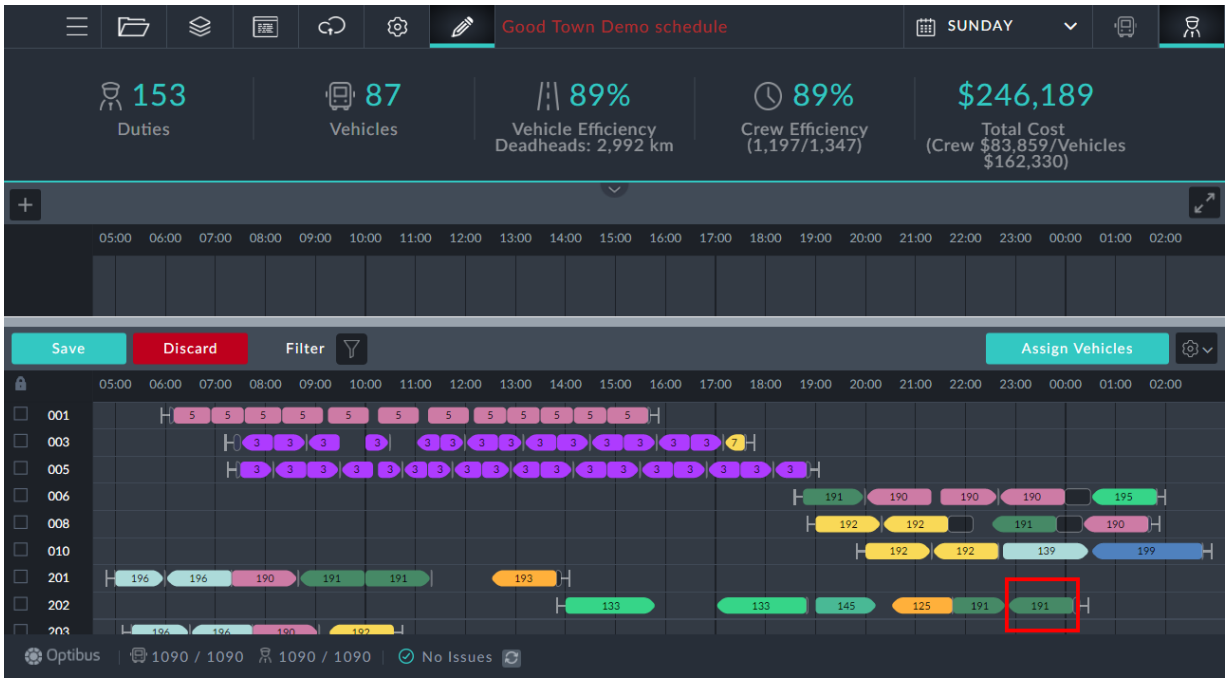
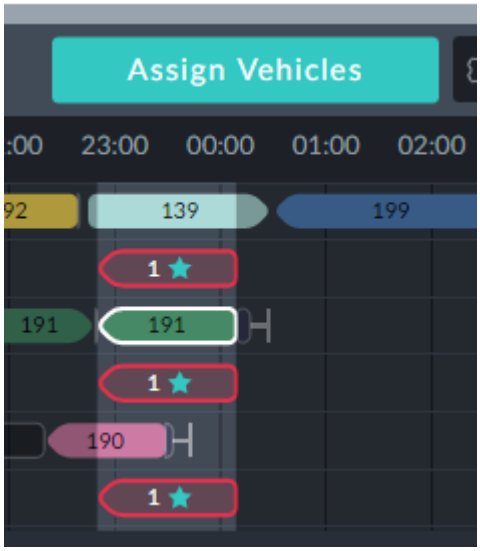


Figure 3-11: Choosing a trip for editing

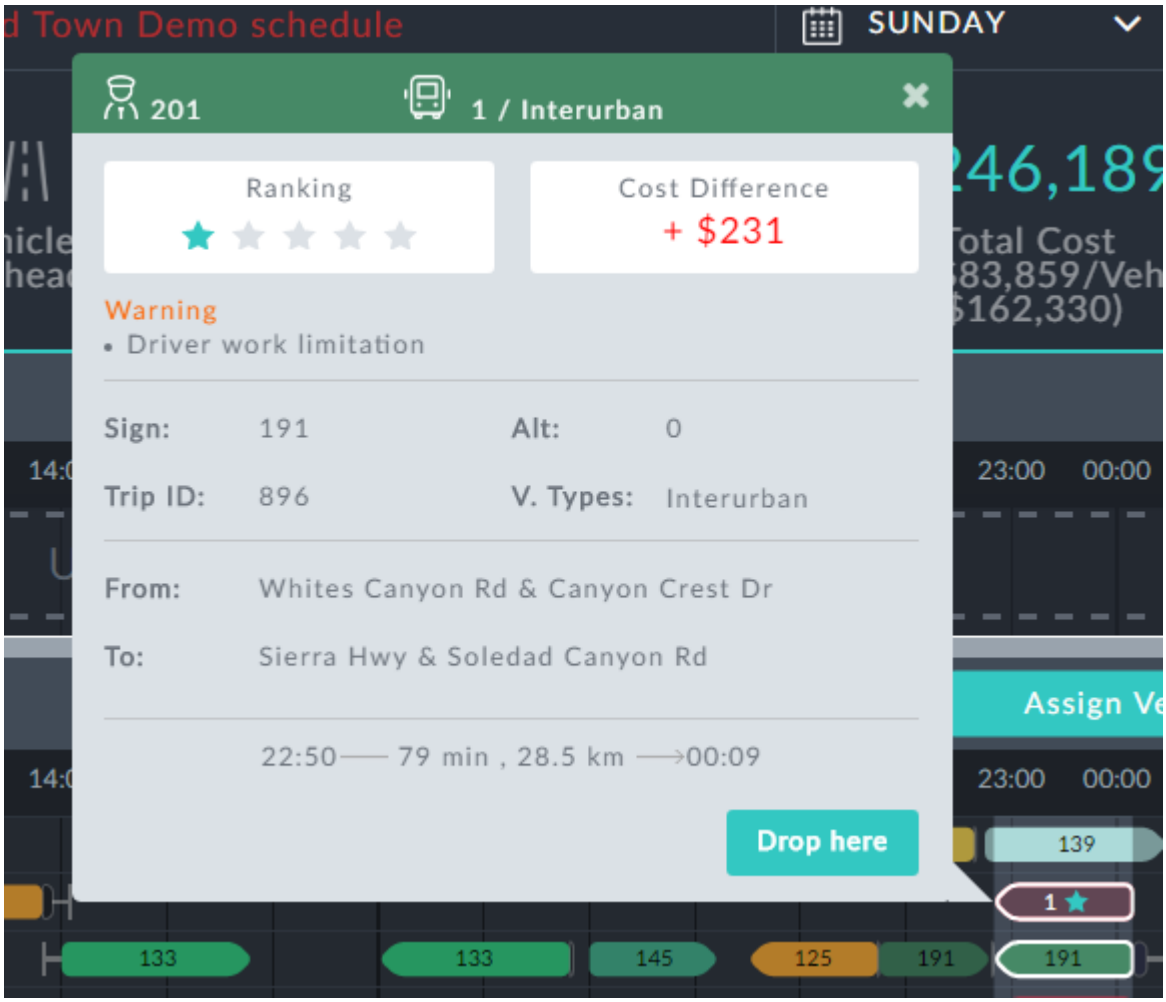
Double click on the last trip of duty 201 (in the red rectangle). The area above and below the selected trip changes:



The system automatically recommends all possible options for relocation of the trip. There are two indications for each option:

A blue frame indicates that preferences are honored. A red frame for an option indicates a violation of preferences. Inside the frame is a quality rating: 1 to 5 stars.

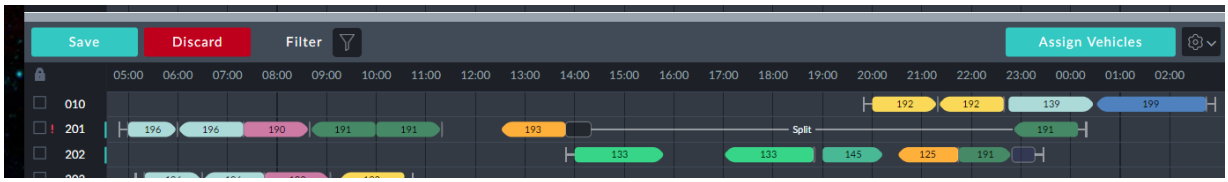
Click the red option above the current trip. A detailed information box opens:



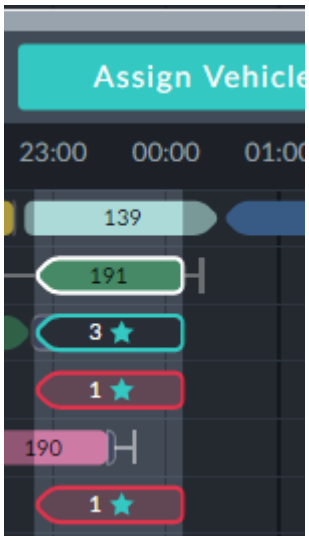
We see that moving the trip to this location violates a Driver work limitation. The information box also displays the stars ranking and the estimated cost difference due to the change.

Click **Drop here** anyway.

Notice that a Split and a Deadhead were automatically added:



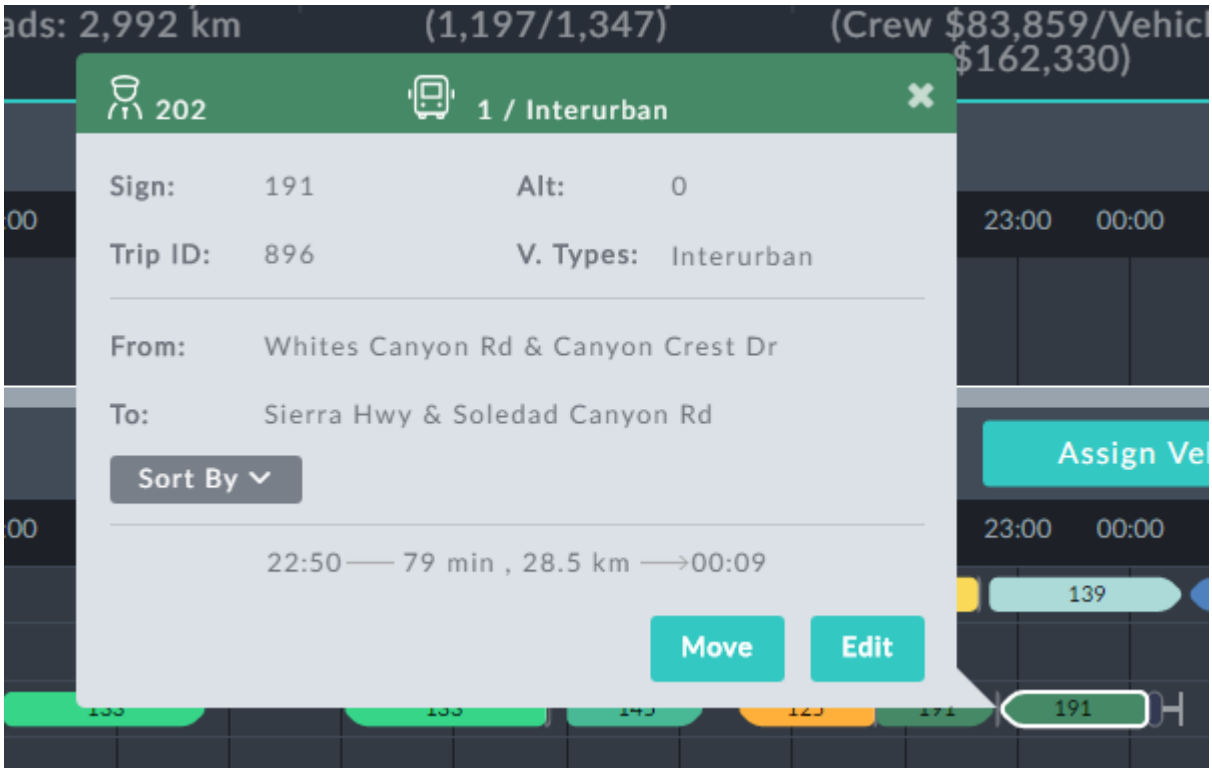
Now reverse the process: Double click the moved trip:



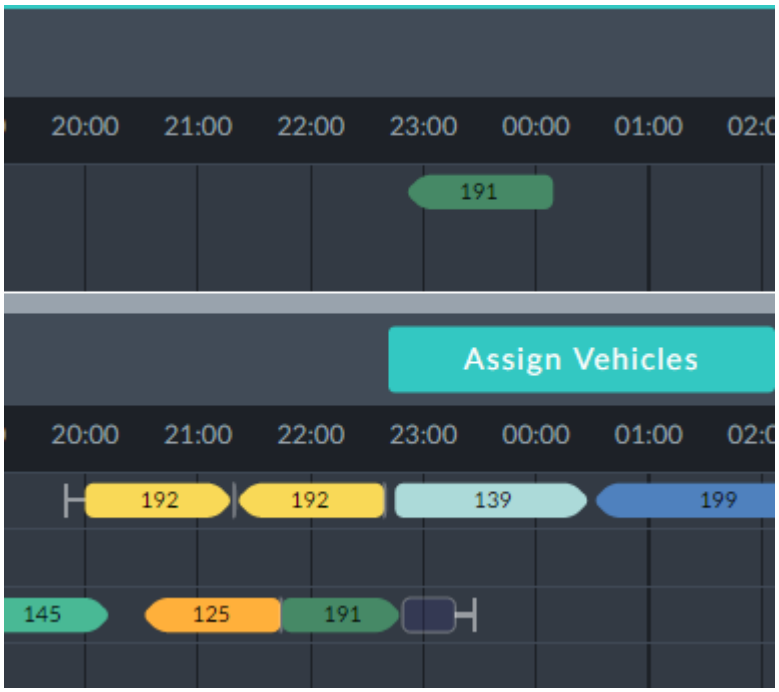
Notice that the original position, the original position has a blue border (all preferences are honored) and three stars. Double click it and accept **Drop here** in the information box.

You can use the **Stack** to store trips for latter allocation.

Left- click (once only this time) the squared item in **Figure 3-11** above:

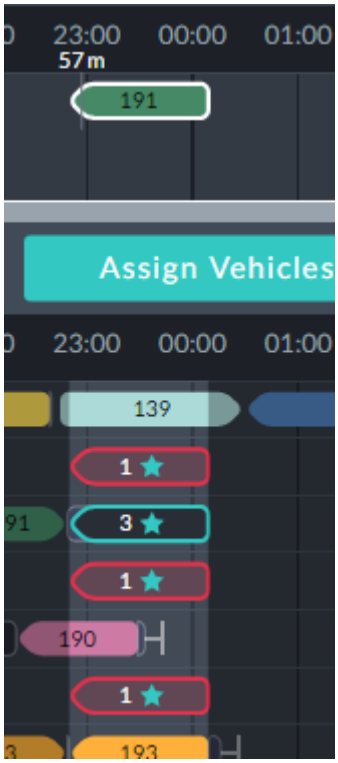


In the information box, click **Move** and then click anywhere over the Stack:



Notice that the trip is kept in its original time frame in the stack.

Double click on the trip in the stack:



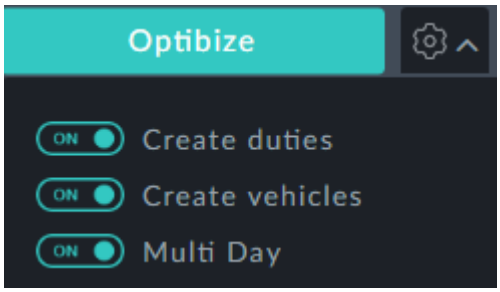
Once again, move it to the first option by double click or by clicking **Drop here**.

As in our previous method, a split and a deadhead trip were automatically added.

Generating a Weekly Schedule

Clicking on any day, will show the Gantt for that day. We will use the Homogeneous schedule from the first part of the **Block Homogeneity** example.

Open up the **Optibize** preference button and switch on **Multi Day:**



Running optimization produces an optimized weekly schedule with optimization between days. A multi day optimization typically takes longer to run than the single day optimizations that we have seen so far.

A quick examination of the Vehicle Gantts for each day of the week, shows that they are each sign-homogeneous.

Technical Reference

Chapter 4: Work-flow Using Optibus OnSchedule™

Setting up a Schedule

TBD

Daily Operations

TBD

Chapter 5: Preparing the Source Files for a Schedule

Files Required to Prepare a Schedule

When a completely new schedule is to be created, Optibus OnSchedule™ must import four data files to create a Dataset:

- Trips - a complete specification of each trip
- Stops - bus stops
- Vehicle Types catalog
- Idle Trips - the Deadheads catalog

In addition, a schedule may also be available for import.

The Operator in conjunction with Optibus supplies these files in the formats shown in **Source File Layouts**.

Source File Formats

General

Optibus OnSchedule™ supports a variety of import formats including Excel, CSV and JSON. It also supports several proprietary integration formats. In what follows below, we will use Excel formatted examples.

Importing Excel Files

When importing Excel files, the four items above appear in one file with four labeled sheets. It is the basis for the imported Dataset and is frequently referred to as a Dataset in its own right. The Deadheads may be in a separate Excel file. The schedule, if available, is also in a separate spreadsheet. The precise structure of these files is set out in **Source File Layouts** below.

Note: The Dataset, Deadheads and Schedule source files may be supplied in different formats.

Locating the Source Files

We continue with Excel files. Ensure that you know the names of the source files and their locations. We will use the files shown here:

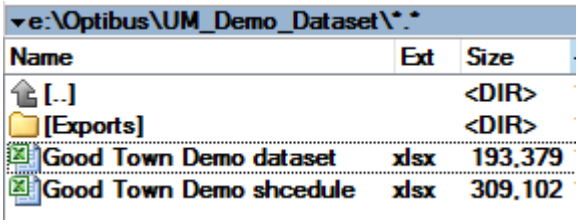


Figure 5-1: Locating the Dataset Excel file

Note: In practice, you may not always have a schedule. Optibus OnSchedule™can generate a schedule for you during the first optimization based on default preferences or preferences of your choice. See TBD.

Source File Layouts

TBD - heavy stuff from Meital &c

Chapter 6: Choosing a Work Schedule

Overview

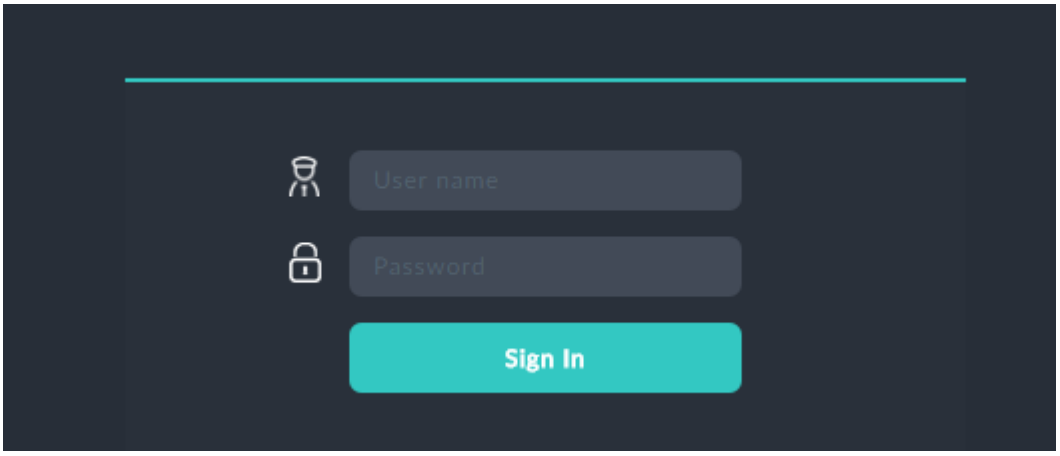
Choosing a Work Schedule is basically a two stage procedure: After logging in to the Optibus OnSchedule™ website, you first choose a Dataset from those available (**Figure 6-1**). You then choose a Schedule from the Dataset (**Figure 6-3**).

Along the way there are many options and variations, which are the subject of this section.

Note: Importing a Dataset and Schedule, or creating a new Schedule for a Dataset are covered in **Creating a Dataset and Schedule**.

Logging in to Optibus OnSchedule™

The Web address (URL) of your OnSchedule™ installation is supplied by Optibus and is customer dependent. In addition, you should have ready, a user name and password. Open up your browser and navigate to it. You will see the log-in window:



Enter your user name and password and click on Sign In. An invalid user name or password will result in an appropriate error message.

Tip: Bookmark the supplied URL for future use.

The opening Dataset Window

After you have logged in, you are presented a Dataset window:

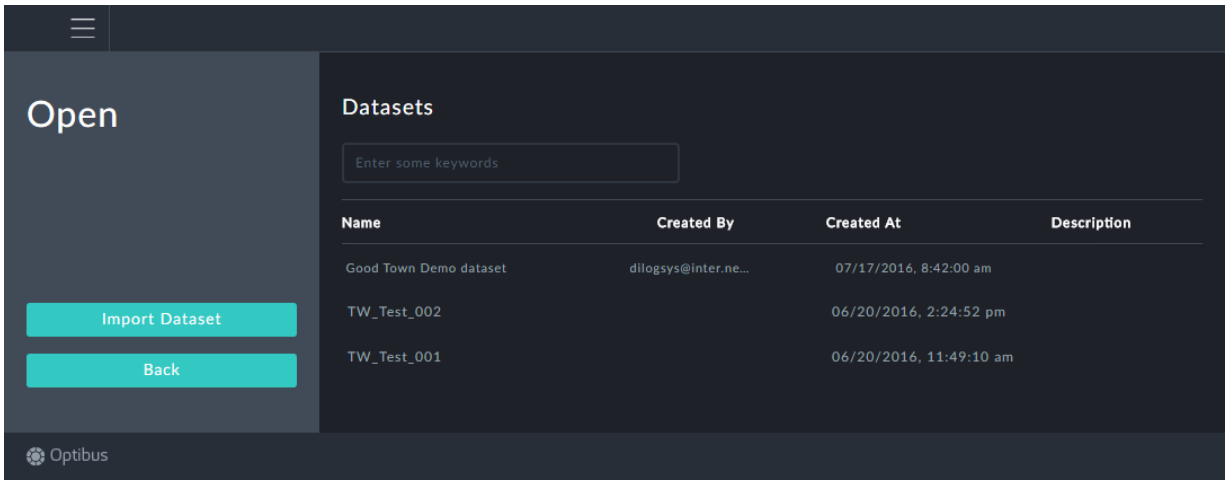
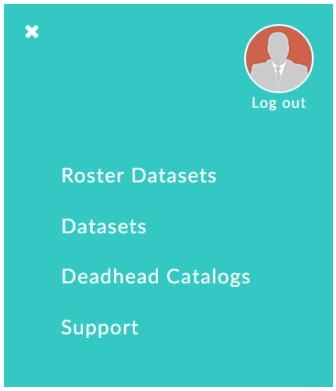


Figure 6-1: Choosing a Dataset

Use the left hand Import Dataset button to import a Dataset in the prescribed format (see **Importing a Dataset**). It will be added to the Dataset list.

The top left context menu button offers the following menu:



The context menu opens from the left. Clicking the small white x at the top left corner dismisses the menu. Clicking Log out logs you out of the system.

The entries are a subset of the Gantt page context menu described in detail in **The Context Menu**.

For immediate use, **Datasets** always drops you back to the Dataset display from where ever you are. **Support** opens a Chat with an Optibus Professional Services Engineer.

Note: Roster Datasets are covered in **Roster Datasets**. The **Deadhead Catalogs** item enables you to choose or import a Deadhead Catalog. It is one of the options described in **The Schedule Display Tool Bar** below.

Note: Any import choice you make or any new item that you create in this section, is loaded using default preferences.

To choose a Dataset, just click it. Notice that if you mouse-over a Dataset it is highlighted, and two action buttons become available:

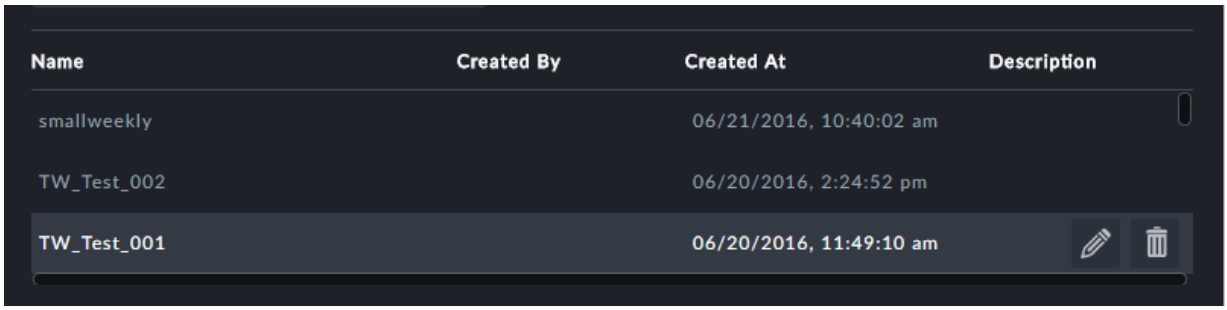
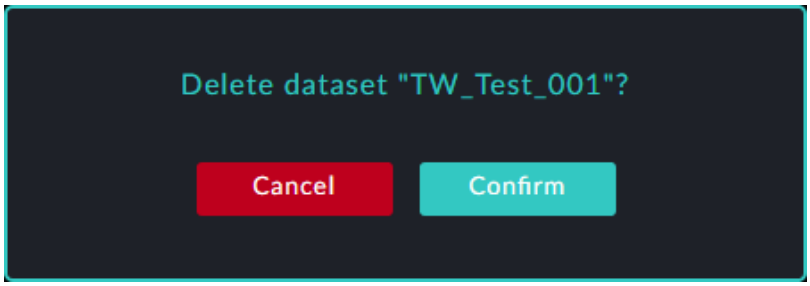
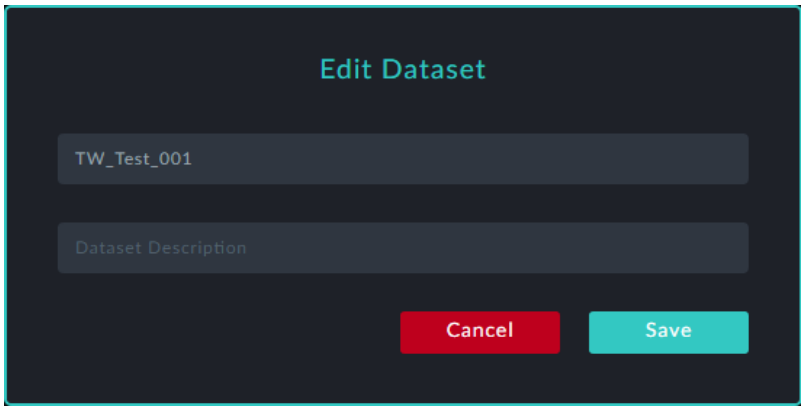


Figure 6-2: Choosing a Dataset

The button allows you to discard the Dataset:



The button allows you to edit the Dataset name and description.



Note: These three buttons are ubiquitous throughout the OnSchedule™ system and mean the much same thing:

is the context menu for whatever window in which it appears

is used to delete the object upon which it appears

is used to rename or edit the object upon which it appears

Choosing a Schedule

We continue, using our choice of Dataset in **Figure 6-2**. The next display allows you to select a Schedule:

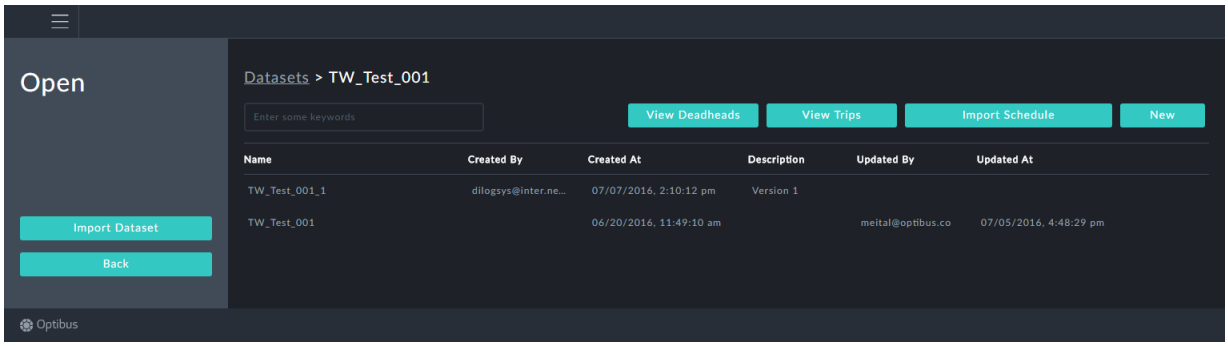
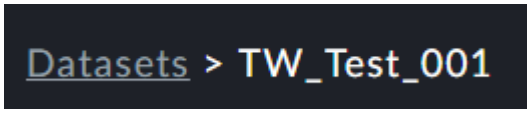


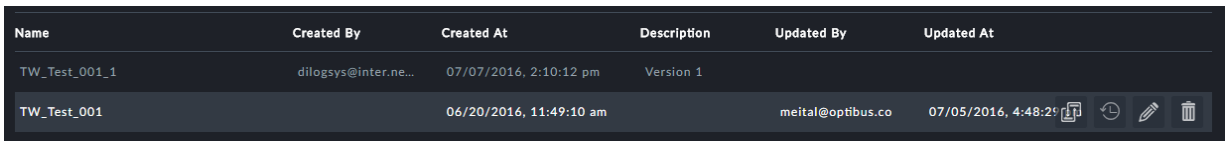
Figure 6-3: Schedule list

Note: For general navigation purposes, you are shown where you are in the system on the top left hand side of the current display page. for example, in **Figure 6-3** above, you are here:



Following modern Web usage, you can click any item in this Web page chain to go to it.

Mouse-over to second item, which is highlighted:



Notice the four buttons on the right that become active. The edit and delete buttons work as previously described. There are two additional buttons:

The button converts a multi-day schedule to a weekly format. See TBD.

The button opens the **Revision** window for the highlighted item.

Revisions of a Schedule

Here is the Revisions window:

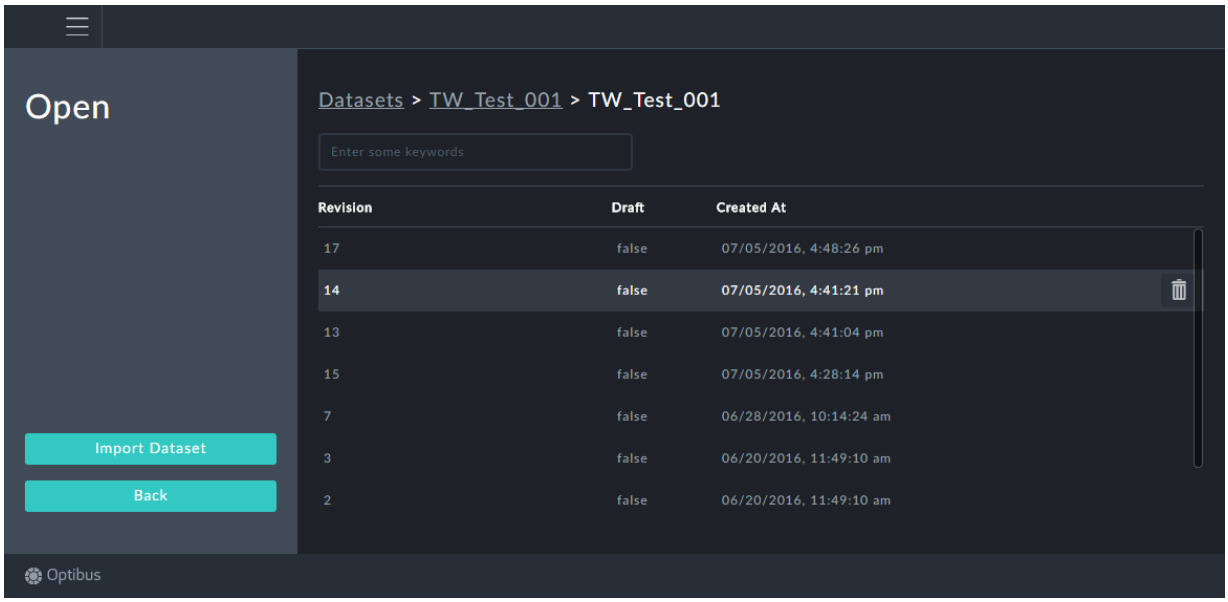


Figure 6-4: Revisions of a Schedule

A **Revision** is an automatic backup created every time you save the working Schedule. The highest numbered Revision is the latest, which you can confirm by looking at the dates.

Caution: If you select a lower Revision, make some changes to it and save it, it will acquire the highest Revision number and become current.

If in **Figure 6-4** you work on Revision 14 and save it, it becomes 19:

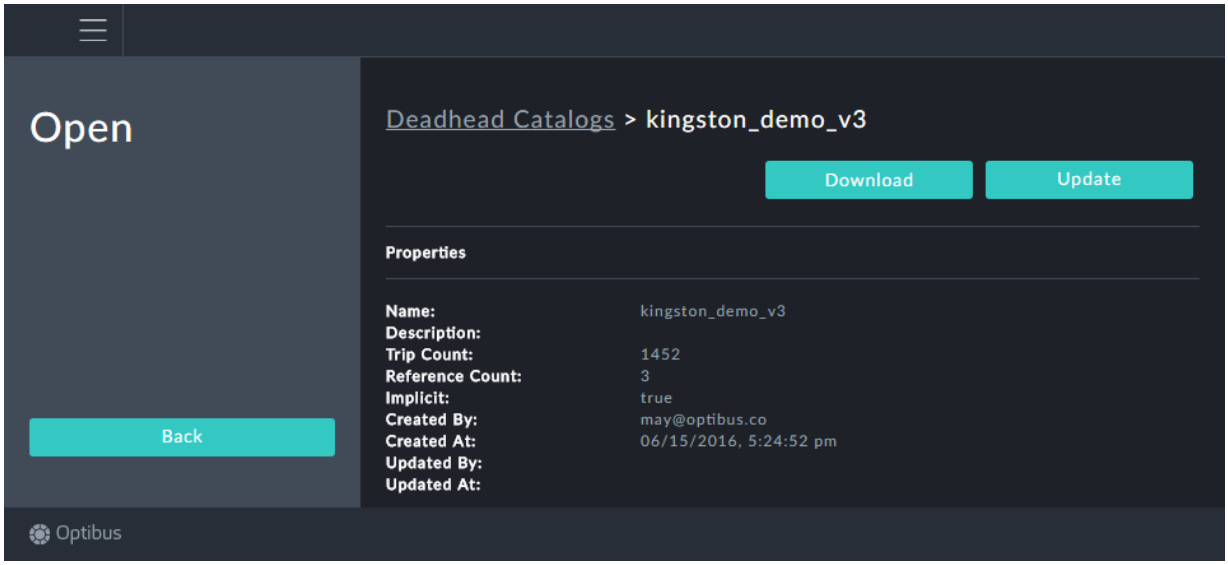
The new Revision number is higher than the last highest but not guaranteed to be the next number (18 here).

The Schedule Display Tool Bar

The Schedule display of **Figure 6-4** has a tool bar:

Figure 6-5: Schedule display tool bar

View Deadheads opens up a Deadhead catalog summary:



Download downloads a zip file containing an Excel Deadhead catalog for the Dataset you chose in **Figure 6-2**. The Update button enables you to upload a Deadhead catalog. It is used to update the current Schedule after optimization or manual editing. See TBD for further information about the Deadhead catalogs.

Returning to the tool bar of **Figure 6-5**

The **View Trips** button opens a display of the Excel Trips list. See TBD for further information about the Trips list.

The **Import Schedule** button opens a standard Windows Open File dialog. See TBD for the content and formatting details for a Schedule for import.

The **New** button opens a new empty schedule and displays an empty Vehicle Gantt.

Context Menu Quick Summary

Table 6-1: Context Menu Summary

Menu Item	Function	Reference
Roster Datasets	Opens the Roster Datasets selection window[1]	
Datasets	Open the Datasets selection window	

[1] This option is only available to cusomers using the Rostering module

Menu Item	Function	Reference
Deadhead Catalogs	Import, download and update Dead-head catalogs	
Support	Open Chat with an Optibus Professional Services engineer	

Chapter 7: OnSchedule™ Main Window

The OnSchedule™ main window is shown in **Figure 7-1** below:

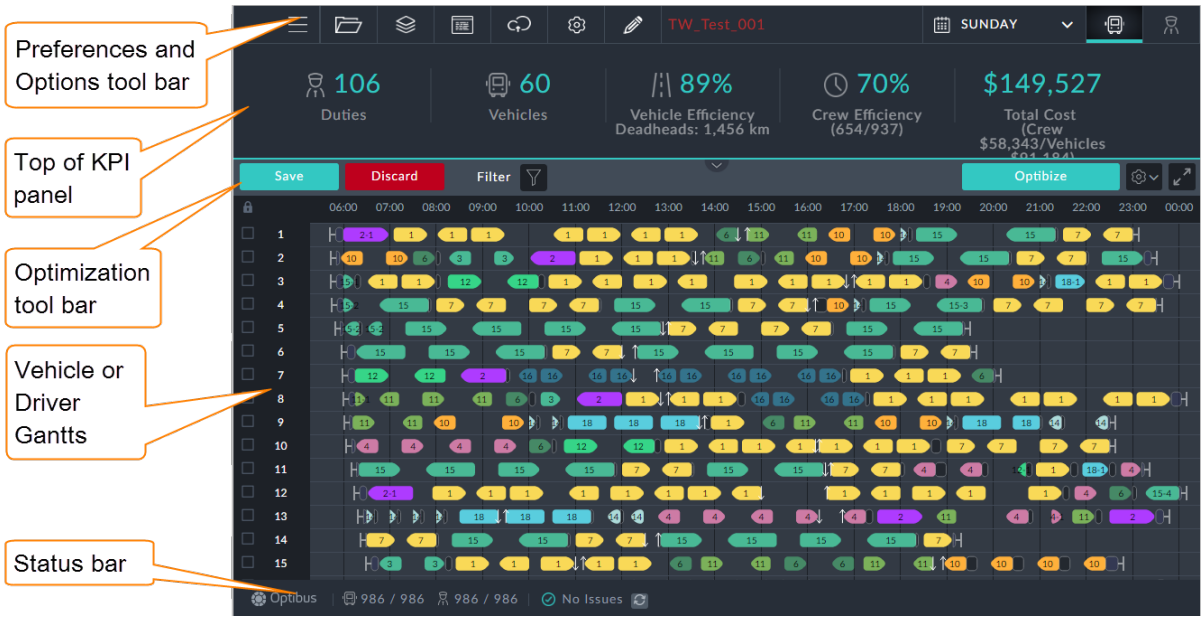


Figure 7-1: OnSchedule™ Main window

The main window is divided in to four panes:

- The top pane contains a tool bar of functions to set up and control the scheduling process
- The second pane contains key performance indicators (KPIs). It is updated dynamically as schedules are added and optimized.
- The large third pane contains the vehicle or driver Gantts. You can view them in turn.
- The bottom pane is a status bar

Top Pane Tool Bar

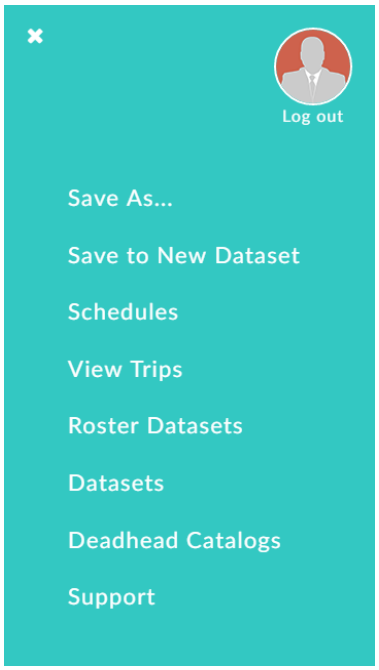
The top pane provides the management functions for the application:

Table 7-1: Top pane tool bar

Icon	Purpose	Reference
	Opens up a pull-out context menu on the left with various save options	**The Context Menu**
	Returns you to the schedule Schedule selection window, one level back.	**Choosing a Work Schedule**
	Schedule updates	**Schedule Updates**
	Export schedules	**Export Schedules**
	Import schedules	**Import Schedules**
	Preferences	**Preferences Organization and Management**
	Manual scheduling	**Manual Scheduling**
	Select a day within the current week	**Select a Day Within Current Week**
	Enter the vehicle scheduler (default)	Switch between Vehicle and Driver Gantts
	Enter the driver scheduler	

The Context Menu

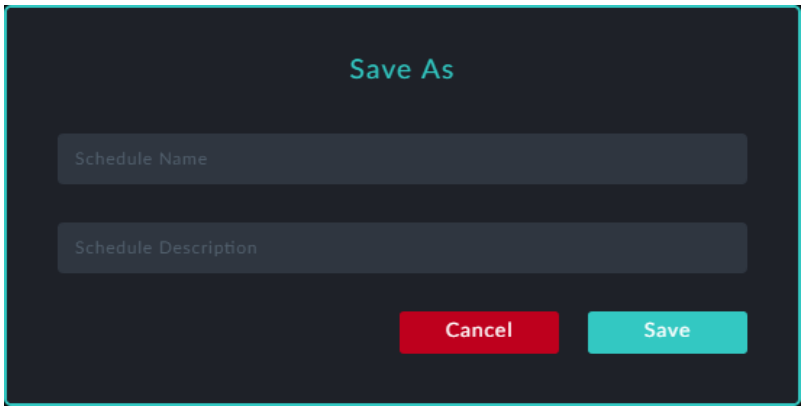
Using the Context Menu



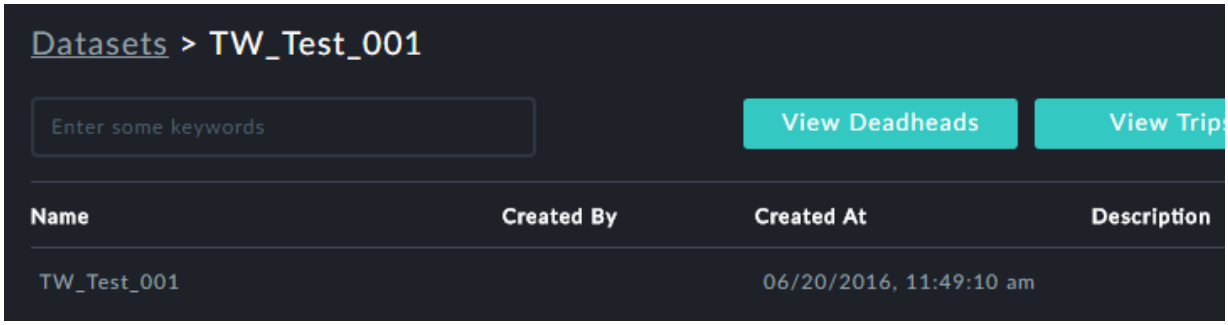
The context menu opens from the left. Clicking the small white x at the top left corner dismisses the menu. Clicking Log out logs you out of the system.

Datasets always drops you back to the Dataset display from where ever you are. **Support** opens a Chat with an Optibus Professional Services Engineer.

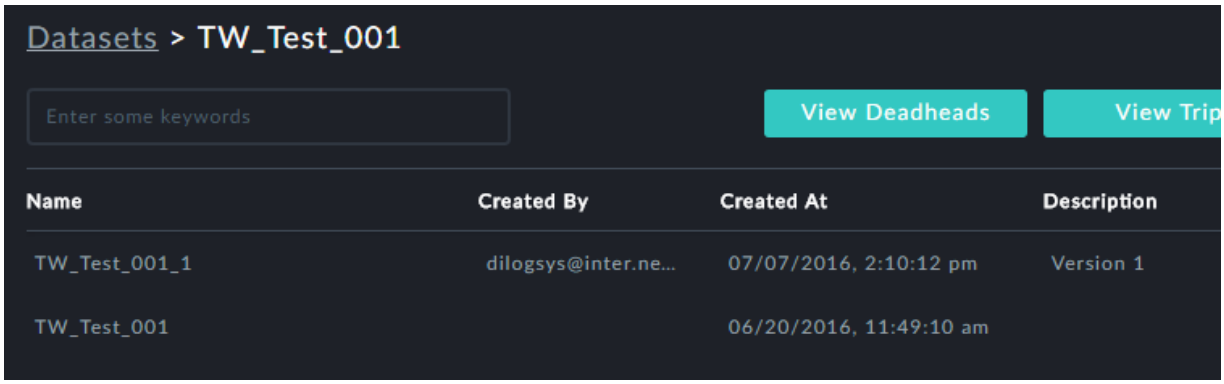
Save As ... opens the follows window:



It creates a new copy of the current open Schedule with the entered schedule name. For example, our case has one Schedule:



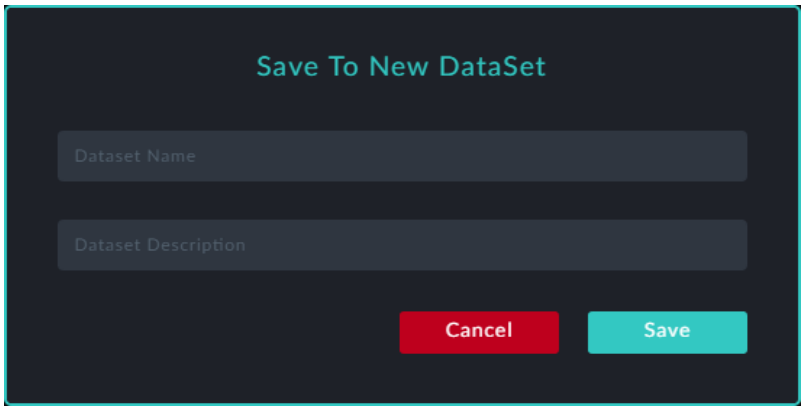
If we enter a schedule name and description, **TW_Test_001_1** and **Version 1** respectively, the saved schedule opens. The previous display becomes:



You can always see the Schedules of the current Dataset by using the **Schedules** option.

Save as ... should be distinguished from the **Save to a New Dataset** option:

Save to a New Dataset opens a similar window to **Save As ...** :



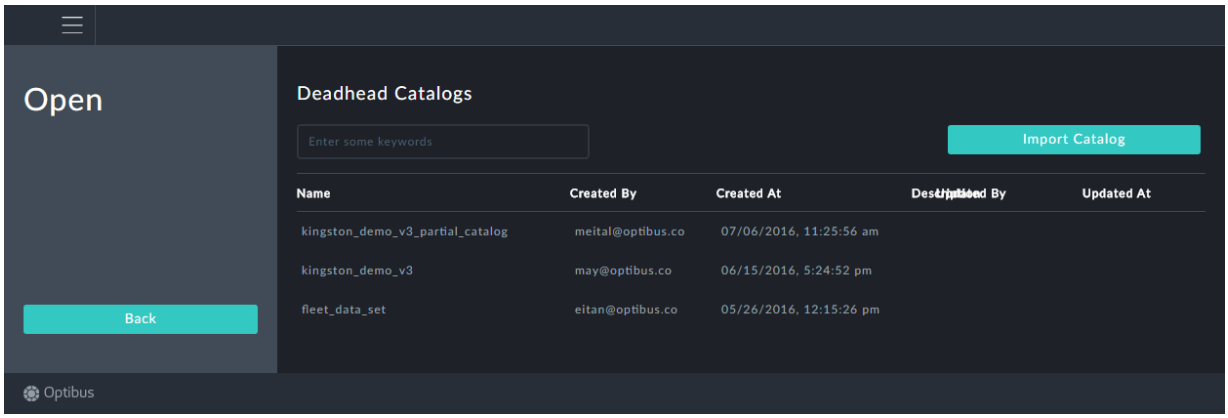
It creates a completely new Dataset, which you will see if you revert to the Datasets window. It adds your current open schedule.

The **Schedules** button takes you back to the Schedules display, Choosing a Schedule

The **View Trips** button opens a display of the Excel Trips catalog. See TBD for further information about the Trips catalog.

The **Roster Datasets** are an optional feature. If available, the button opens up a list of available roster Datasets. See **Roster Datasets**.

The **Deadhead Catalogs** button opens a list of Deadhead catalogs for all of the available Datasets:



Choosing any one of them opens up a Deadhead summary in the same manner as we saw in View Deadheads.

Context Menu Quick Summary

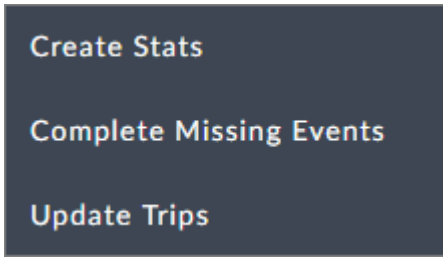
Note: Any import choice you make or any new item that you create when a Schedule is loaded, is based on user preferences.

Table 7-1: Context Menu Summary

Menu Item	Function	Reference
Save As ...	Save open Schedule with a new name	
Save to New Dataset	Creates a new Dataset and saves the open Schedule to it	
Schedules	Open the Schedules selection window	
View Trips	View Trips Excel file	
Roster Datasets	Opens the Roster Datasets selection window	
Datasets	Open the Datasets selection window	
Deadhead Catalogs	Import, download and update Deadhead catalogs	
Support	Open Chat with an Optibus Professional Services engineer	

Schedule Updates

This button opens a sub-menu of its own:

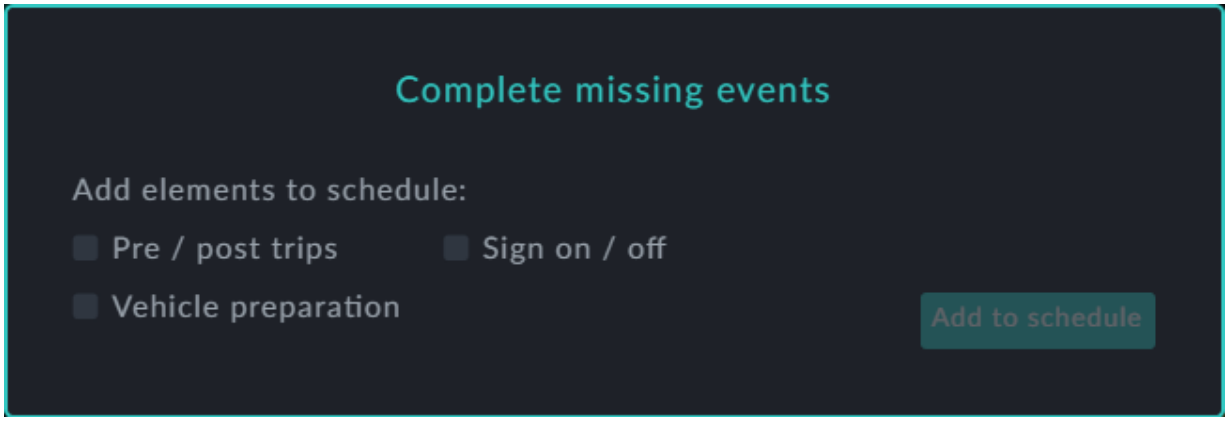


Create Stats

TBD - example before and after.

Complete Missing Events

This item opens up a choice dialog:



Check the elements required. If missing, they are auto-generated and added to the open schedule.

TBD - example before and after.

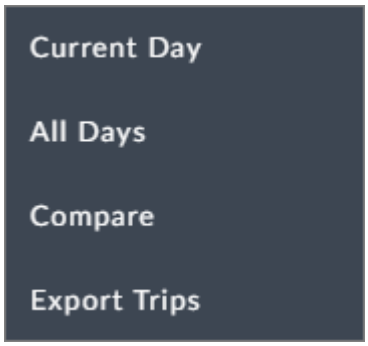
Update Trips

This item opens a standard Windows Open File dialog. (See TBD for the content and formatting details for a Trips catalog.) It applies the update to the open schedule.

TBD - example before and after.

Export Schedules

This button opens a sub-menu of its own:



Current Day

This downloads the current day schedule to a zip file.

TBD - Same format as Export?

All Days

This downloads the current week schedule to a zip file.

TBD - Same format as Export?

Compare

The Compare feature provides an extensive comparison between the currently open Schedule and any other of your choice.

TBD - Need a session!

Export Trips

A single trips Excel file is generated. It contains three pages, Trips, Places and Stops in the same format as the Operator's trip file required to create the Vehicles Gantt. See TBD for further details about the trips file.

Import Schedules

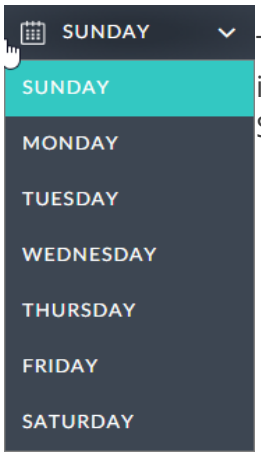
This button open a standard Windows Open File dialog.

TBD - What happens next?

Manual Scheduling

TBD - Requires a session!

Select a Day Within Current Week



This drops down a day of week choice menu. Selecting a day will load its Schedule. If there is no Schedule defined for the day, an empty Schedule will open showing an empty Vehicle Gantt.

Optimization Tool Bar

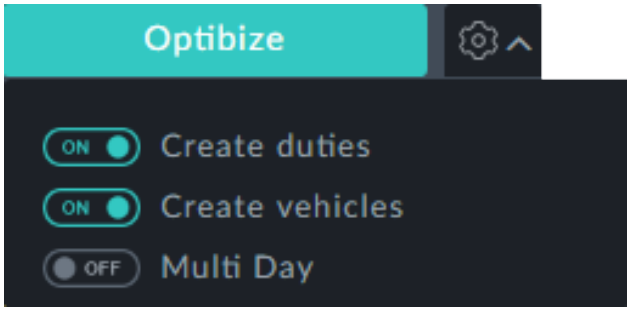
The tool bar above the vehicle and driver Gantts is used for optimization and saving results:

Following any editing change or optimization run, the tool bar changes to this:

The **Save** button applies your changes or the optimization to the Schedule. The **Discard** button throws them away.

The **Filter** button ....TBD

The button opens a drop-down choice list associated with the Optibize button:



By default, the optimization will use the two checked items. If your Dataset has more than one day in it, then switch on **Multi day** to optimize them all.

A detailed discussion of the optimization options and process is covered in **Optimizing a Schedule**.

Click the button to dismiss the menu.

The button expands the Gantt area over the KPI area. It changes form to the collapse button, which reverts to the normal part KPI and Gantt view.

The Key Performance indicators (KPI) Window

KPI Window Overview

In the main window (**Figure 7-1**), click the expand icon, . The full KPI area opens:

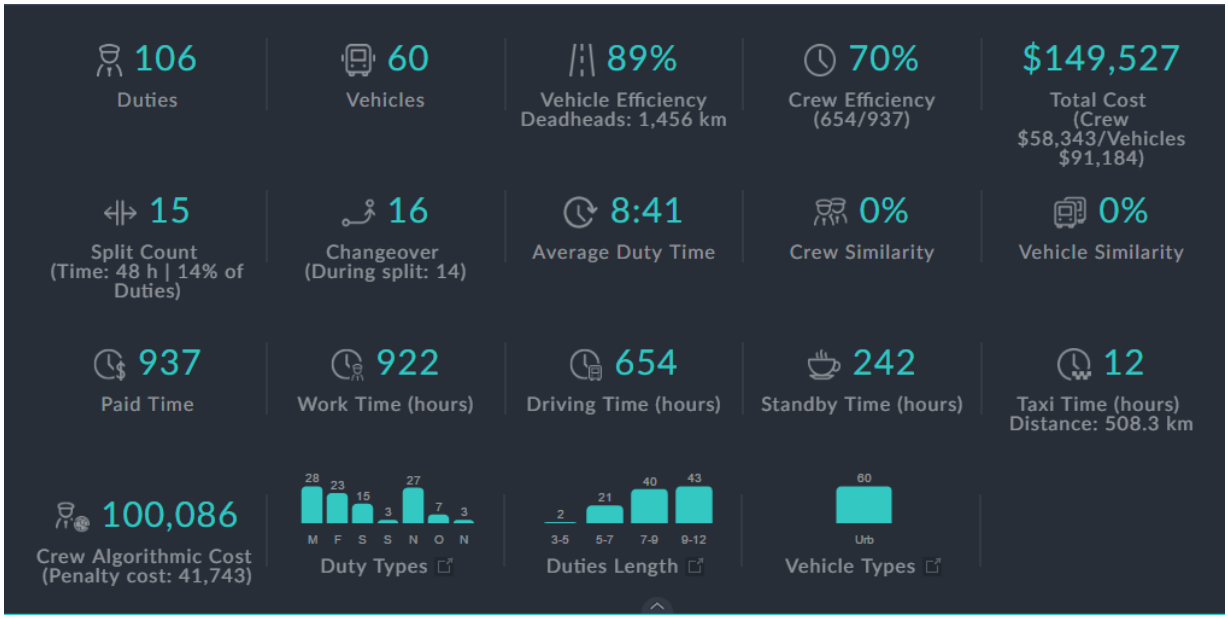


Figure 7-2: The KPI window

Clicking the icon at the bottom of the window, reverts it.

These indicators provide a projected performance summary for the schedule. It will of course change under manual editing and optimization.

Indicator Details

Table 7-1: KPI details

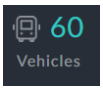
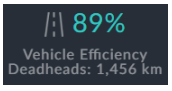
Item #	Indicator	Description
1.		Total number of driver duties
2.		Total number of vehicles
3.		Vehicle efficiency: Ratio of total service trip distance to aggregate traveled distance for the day. The difference is the deadhead distance shown on the last line. The latter distance also includes Pull ins and Pull outs.

Table 7-1: KPI details

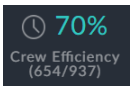
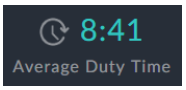
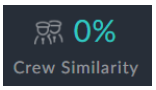
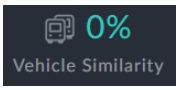
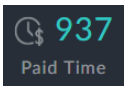
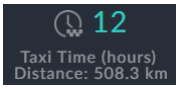
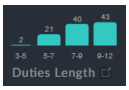
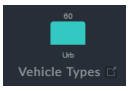
Item #	Indicator	Description
4.		Crew efficiency: Ratio of driving time (item 13) to paid time (item 10).
5.		Total cost for the day: Crew cost + vehicle costs (based on running cost and an overhead contribution. See TBD.)
6.		This item shows the number of split duties, split time and the ratio of the number of split duties to the total number of duties
7.		Total number of driver changeovers and the total number of driver changeovers during a split
8.		Average driver duty time: Total work time (item 12) divided by the number of duties (item 1) in hours:minutes
9.		Crew similarity: A measure of similarity between the current changed duties schedule to the previous one. See Preferences TBD.
10.		Vehicle similarity: A measure of similarity between the current changed vehicles schedule to the previous one. See Preferences TBD.
11.		Paid time consists of components defined by the Operator. It typically includes driving time and paid breaks and other paid elements.
12.		Actual work time usually consists of paid time and unpaid elements but not including split time.
13.		Driving time consists of all driving events, such as service trips, deadheads, pull ins and pull out.
14.		Standby time consists of any time not occupied by an element in the Driver Gantt. (Split time is not included.)
15.		Taxi time and distance. Recall that When a driver completes a trip, he may be required to go to a different location for his next trip or even to take a break. To get there, he may require transport such as a taxi , a shuttle or perhaps walk.

Table 7-1: KPI details

Item #	Indicator	Description
16.		This is a hypothetical costing using theoretical "penalties" associated with Preferences. It provides an expert planner with a tool for assessing his choices.
17.		Distribution of driver duties by duty type. See **Figure 7-3** below.
18.		Distribution of driver duties by duty paid time. See **Figure 7-4** below.
19.		Distribution of driver duties across vehicle type. See **Figure 7-5** below.

Driver Duty Histograms

The last three items in **Table 7-1** above expand into histograms. To see them, click the appropriate item in **Figure 7-2**.

Note: You can move between the histograms by clicking the < and > buttons on the sides of the displays.

The following three examples are drawn from several unrelated Datasets, purely for illustrative purposes:

Distribution of Driver Duties by Duty Type

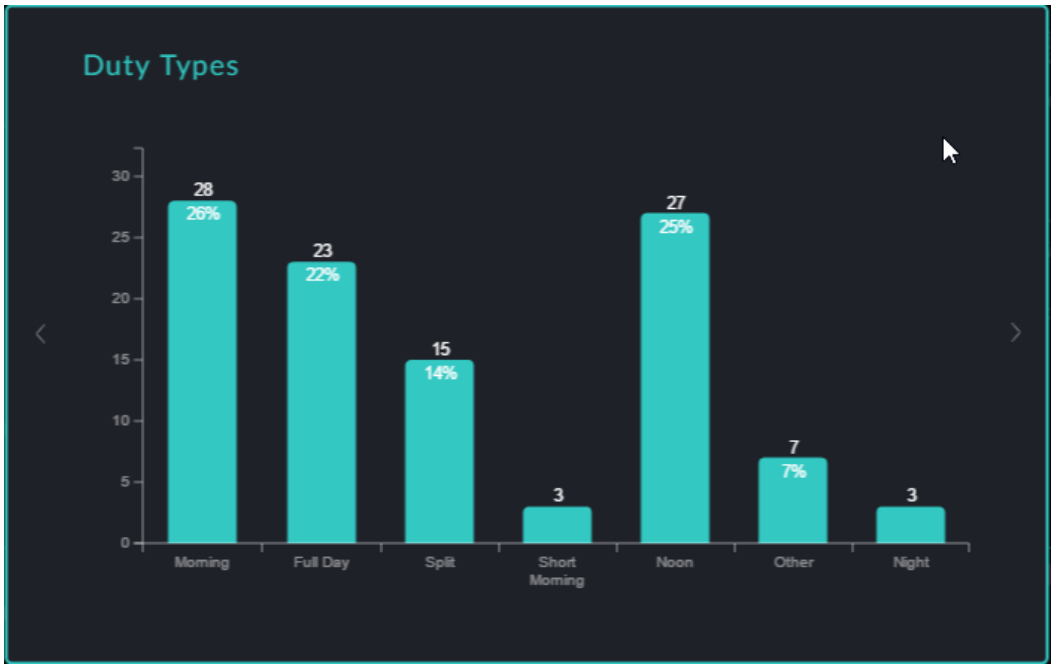


Figure 7-3: Duty by Duty Type

Recall that the Duty Type is defined by the Operator.The chart shown the number of duties and the percentage of duties per Duty Type.

Distribution of Driver Duties by Duty Paid Time

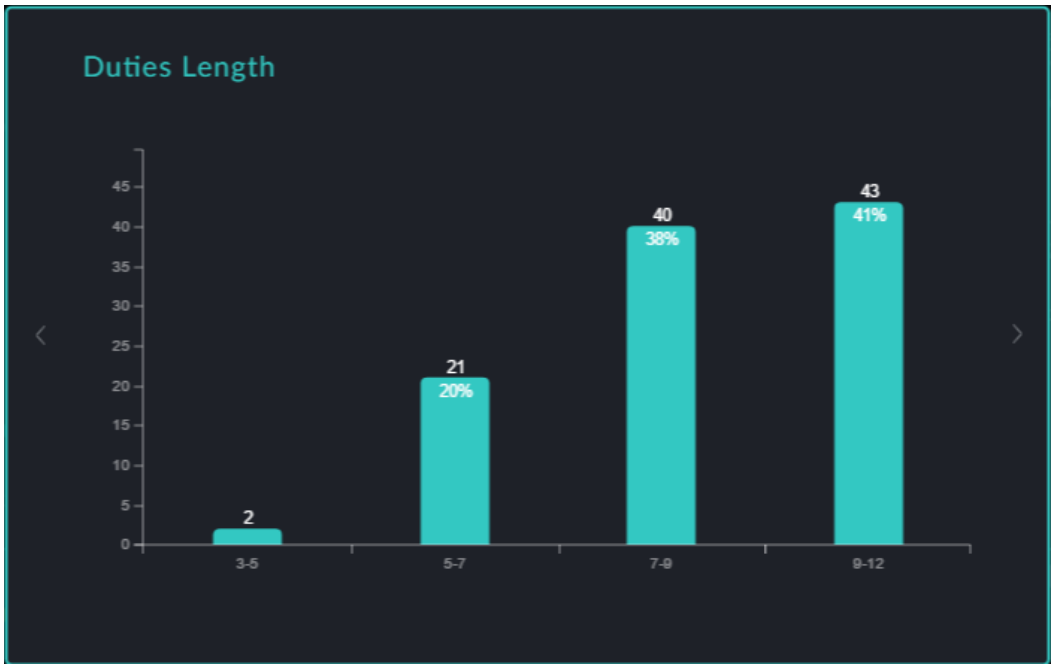


Figure 7-4: Duty by Duty Paid Time

The duty paid time intervals for this histogram are grouped by the Operator. Again, the number of duties in each interval and the percentage are shown.

Distribution of Driver Duties Across Vehicle Type

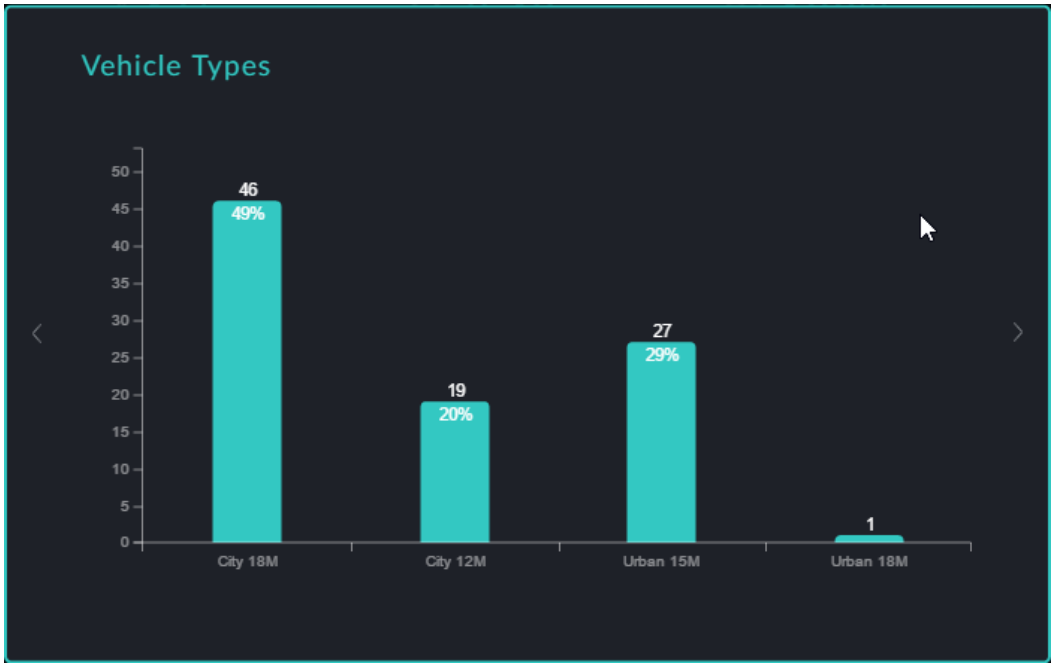


Figure 7-5: Duty by Vehicle Type

The number of vehicles and the vehicle percentages are shown by vehicle type. Vehicle types are defined by the Operator.

Vehicle Gantt

Vehicle Gantt Overview

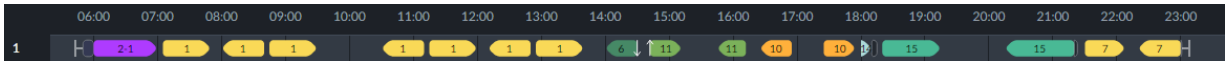
The Vehicle Gantt is opened by default. You can always return to it from the Driver Gantt by clicking the vehicle icon in the Options tool bar.

Note: If you need more space on your screen, you can hide the KPI by clicking the button. To restore the KPI, just click it again.

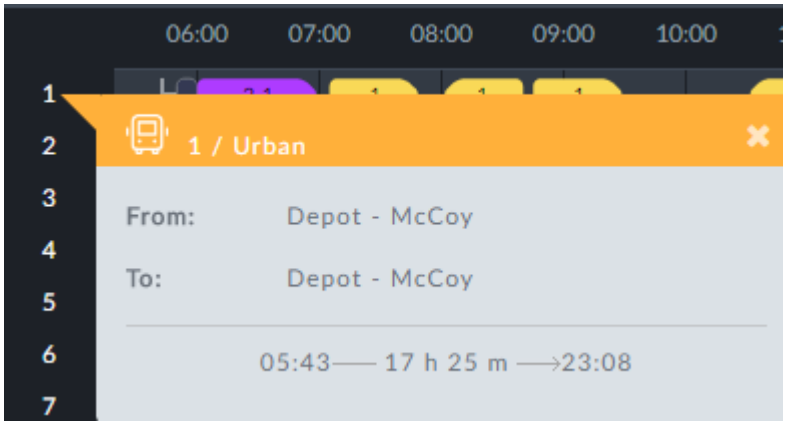
The window contains a vast amount of detail, but nevertheless, it is very easy to follow. For example:

Figure 7-6: A typical Vehicle Gantt

Each numbered row on the Gantt shows the day's itinerary of one vehicle. Take for example, row 1:



First, you can see a quick row overview by left-clicking the row number:



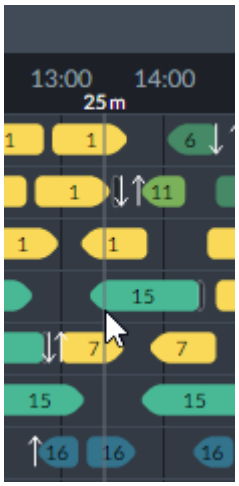
The start and end times relate to the day's work for the vehicle. The duration is also displayed.

Let us return to the Gantt itself:
The graphic shapes are called **elements**.

Each colored bullet shaped element represents a **service trip**.

Figure 7-7: Service trip element

Note: A service trip is a revenue-earning vehicle journey.



The number is the route **sign**. In the left hand example , the route as seen by a passenger, is 2-1. The difference between a simple number and a hyphenated number such as 2-1 will be explained shortly. Looking at the Gantt, It's **row number** is the **vehicle ID**. The position of the left end of the element is the time of the beginning of the trip and the position of right end is the time of completion. You can see the times precisely by moving the mouse horizontally along the row. A vertical cursor line indicates the time. Observe the vertical cursor line at 13:25 at the mouse position.

Note: The service trip coloring is determined by the system to make the display easy to understand. **Each sign has its own color.**

From the transport operator's perspective, a route has three parameters. Referring to **Figure 7-7** above, they are:

- A sign defining the service trip terminus points - in the example it is 2
- A direction - at which terminus the trip starts and which terminus the trip finishes determines the direction on the Gantt of the bullet shape
- An alternate number indicating a route variant. A route variant for example may add or skip stops in the base route. In the example it is 1 and the passenger sees 2-1 as shown.

Further information may be obtained by left-clicking an element. Let us take another example, left-clicking the third service trip element in row 1. An information box pops up:

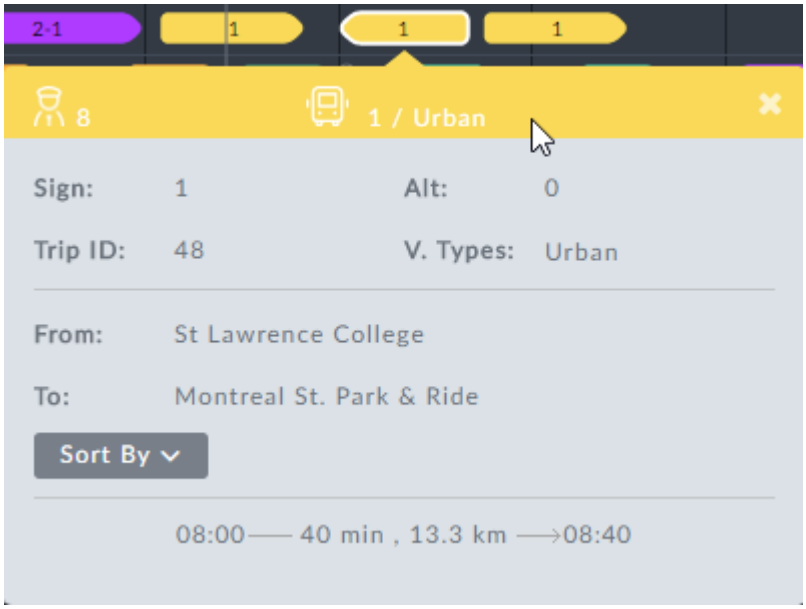


Figure 7-8: Element information box

Notice the **From: ... To: ...** locations. If you left click-the fourth item following, you will see that the **From: ... To: ...** locations are reversed - the vehicle is scheduled for a return trip.

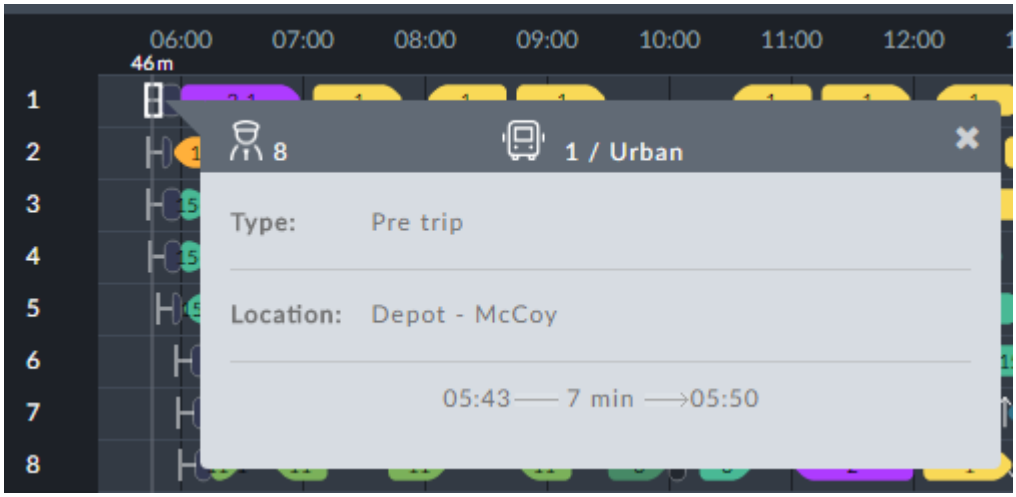
Note: Left-clicking any active element in the display will open an information box describing it in detail. In most cases, the chosen element has a white border as seen in **Figure 7-8**.

We will return to the information box in detail below.

Note: Sometimes a trip icon may be an oblong shape instead of a bullet shape. It indicates a round-trip that starts and finishes at the same terminus.

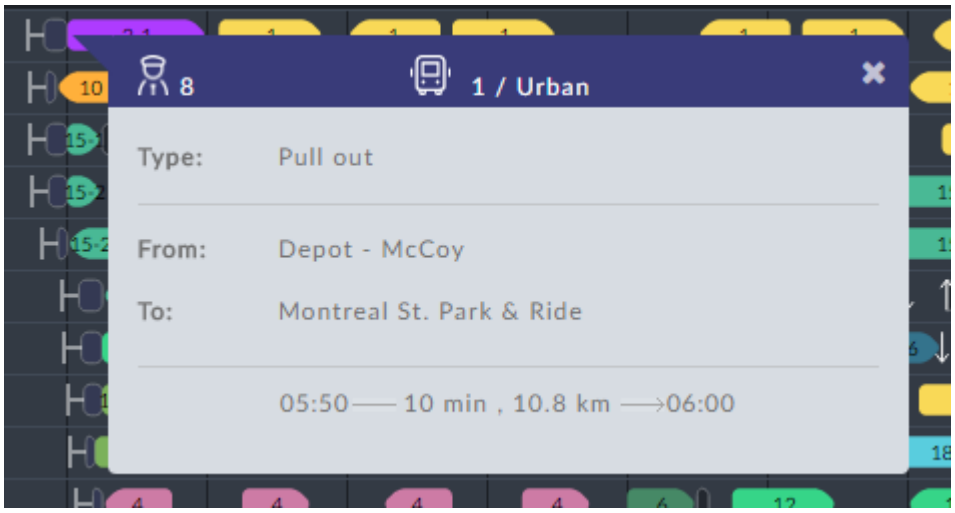
To complete your understanding of the example, we will look at several other elements appearing on row 1.

The row commences with the symbol .Left clicking it opens an information box:



The symbol represents pre-trip activity. It may also show as **Vehicle Preparation**. This is an Operator choice.

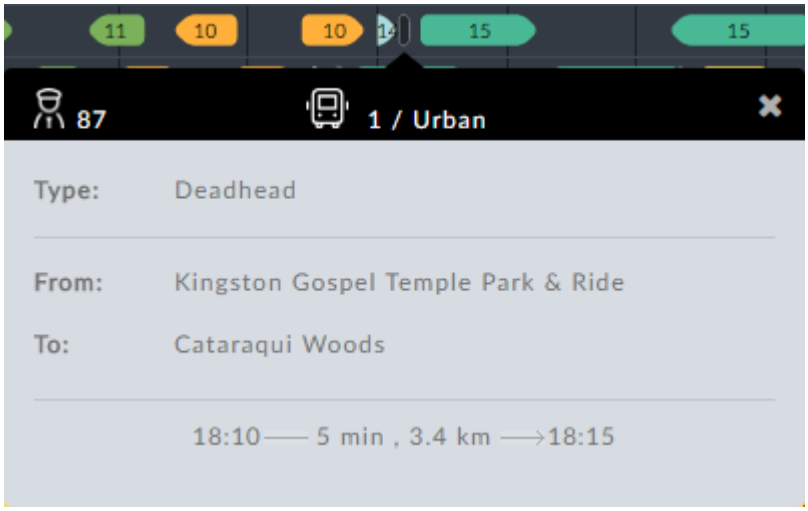
The next graphic element looks like this: Left clicking it shows a **Pull out** information box:



The length of the Pull out graphic reflects the time required. The same graphic at the end of a trip or at the end of a day denotes a **Pull in**.

Note: Pull out and **Pull in**: Moving a vehicle from a depot to the first stop of a service trip is called a Pull out. What is considered to be a "Depot" here, is determined by the Operator. In the opposite direction, a Pull in is moving a vehicle from the last terminus of a service trip back to the depot.

Once again, on the top row at about 18:13, there is a similar graphic with a black background, . Left-clicking it shows **Deadhead** information:

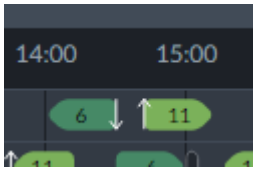


Again, the length of the graphic reflects the time required for the deadhead trip.

Note: A deadhead is any non-revenue earning vehicle movement other than pull out and pull in.

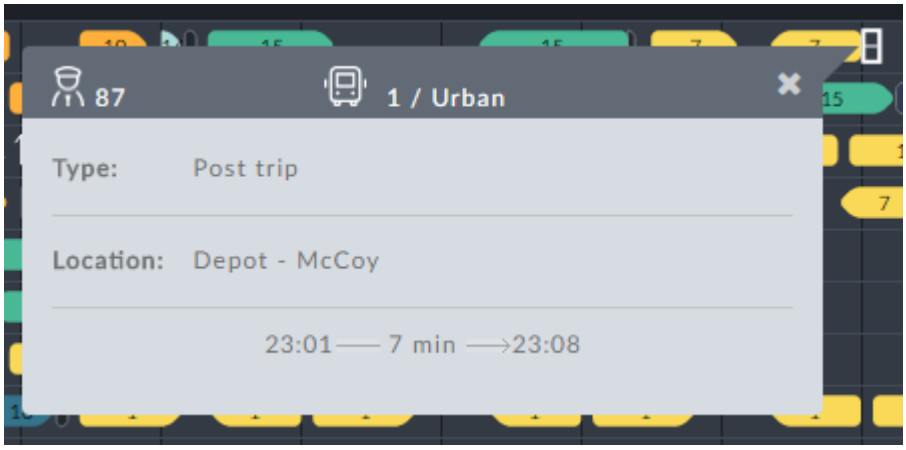
Note: Deadhead, pull out or pull in icons with a white dot in the center, for example like this, are auto-generated by the system. You can edit them in your Deadhead Catalog (see TBD).

Look now, at the period between 14:00 and 15:15:



The down arrow to the right of sign 6 indicates that the driver has left the vehicle (for example going off-duty or taking a break). The up arrow following indicates that a **different** driver has taken the vehicle.

Finally, at the end of row 1 is a post-trip symbol, . Left clicking it, displays post-trip activity:



The Vehicle Gantt in Detail

In this section we look at the information boxes in detail.

Note: The Vehicle Gantt information boxes become active data entry panels during Manual Vehicle-only Scheduling. See TBD.

Note: An open information box may be dismissed in three ways:

- Clicking the x in the top right corner of the box
- Opening another box
- Clicking an unused area on the display

Workday Overview for a Vehicle

Left-clicking a row number pops up a work day overview for the vehicle:

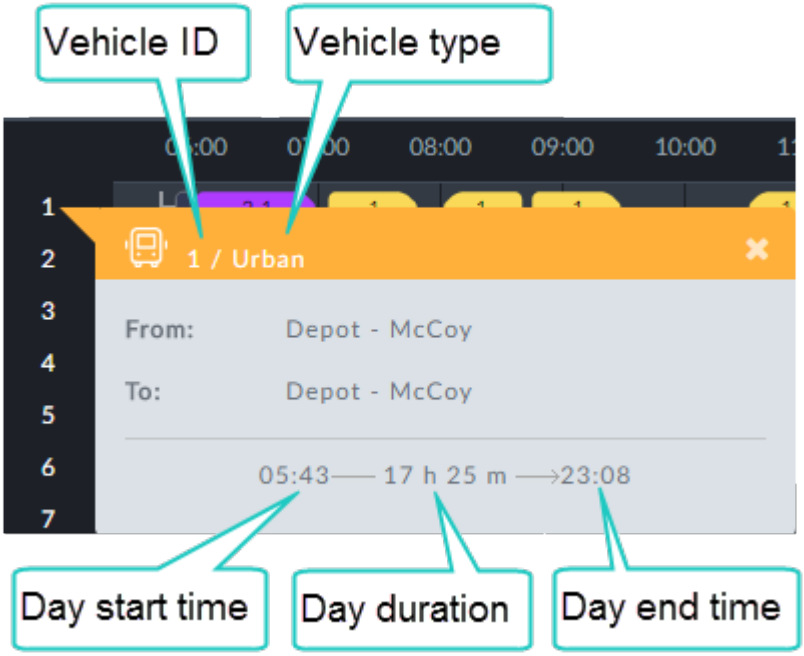
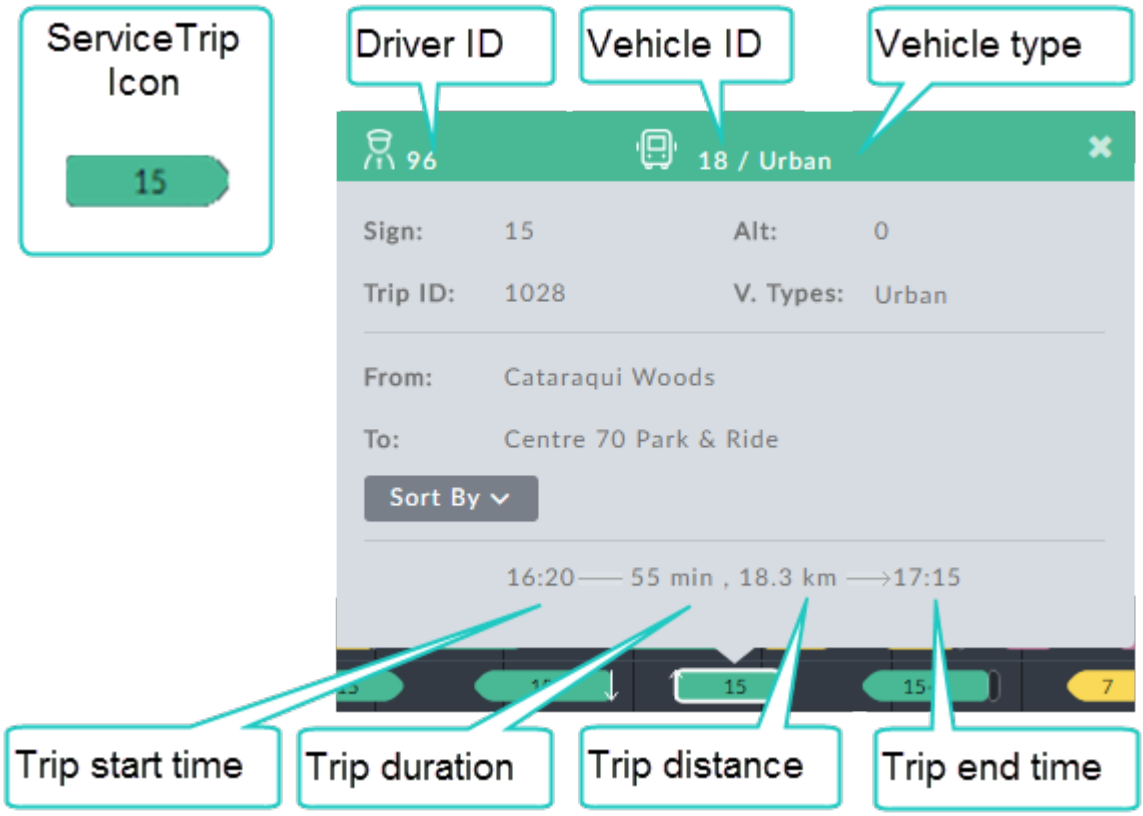


Table 7-1: Row overview information box

Information Box Item	Description
From:	Start location at the beginning of the work day
To:	The final location of the vehicle at the end of the work day

Service trip



The remaining items inside the gray area are described in **Table 7-2** below:

Table 7-2: Service trip information box

Information Box Item	Description
Sign	Route number as seen by the passengers
Alt	Alternative route: Used for route variations. A variation for example, may skip or add some stops. An Alt is one of the following: 0 or # - indicates the base route Anything else indicates an alternate route
Trip ID	Operator's trip ID. Every trip has its own unique ID
V. Types	Eligible vehicle types for this trip. Several types may be displayed.
From:	Service trip origin

Information Box Item	Description
To:	Service trip destination
Sorted by	See section **Sorting the Vehicle Gantt** below.

Note: *About direction:* The Operator distinguishes route direction for a service trip using the **From:/To:** fields.Visually, they determine the direction of the bullet shape on the Gantt. To show the opposite direction, you swap the **From:/To:** locations and the resulting bullet shape points in the opposite direction.

Deadhead

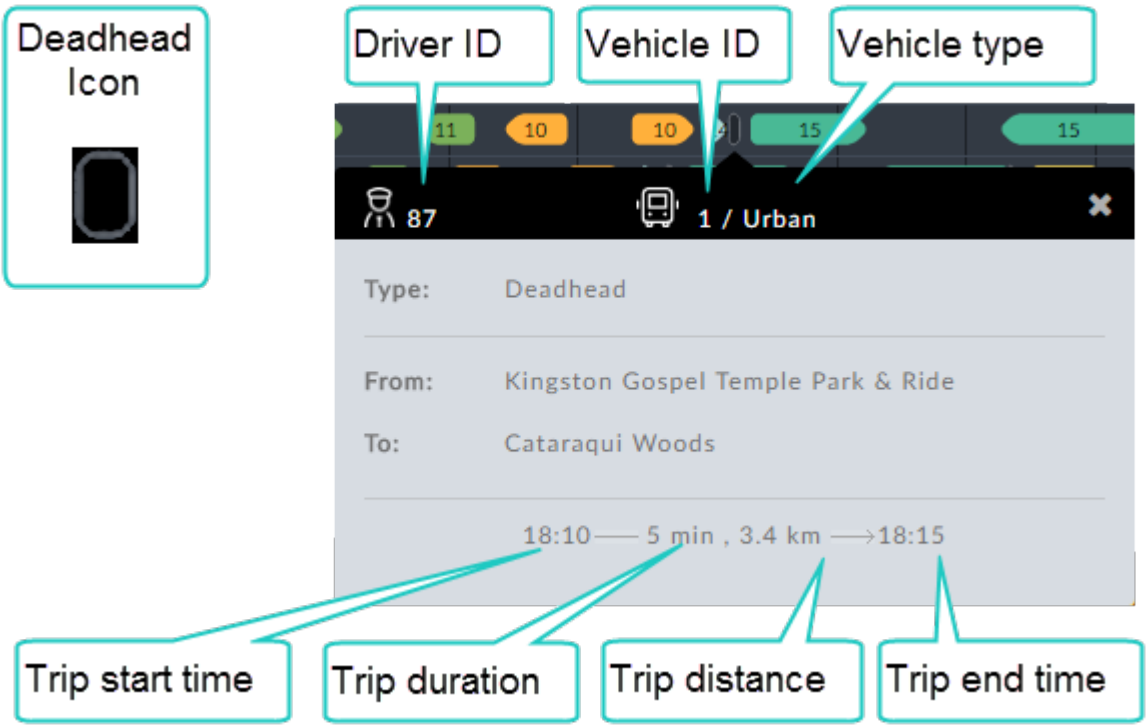


Table 7-3: Deadhead information box

Information Box Item	Description
Type	Information box type - Deadhead
From:	Deadhead start - typically the end point of a service trip
To:	Deadhead end - typically the start point of a service trip

Pull out

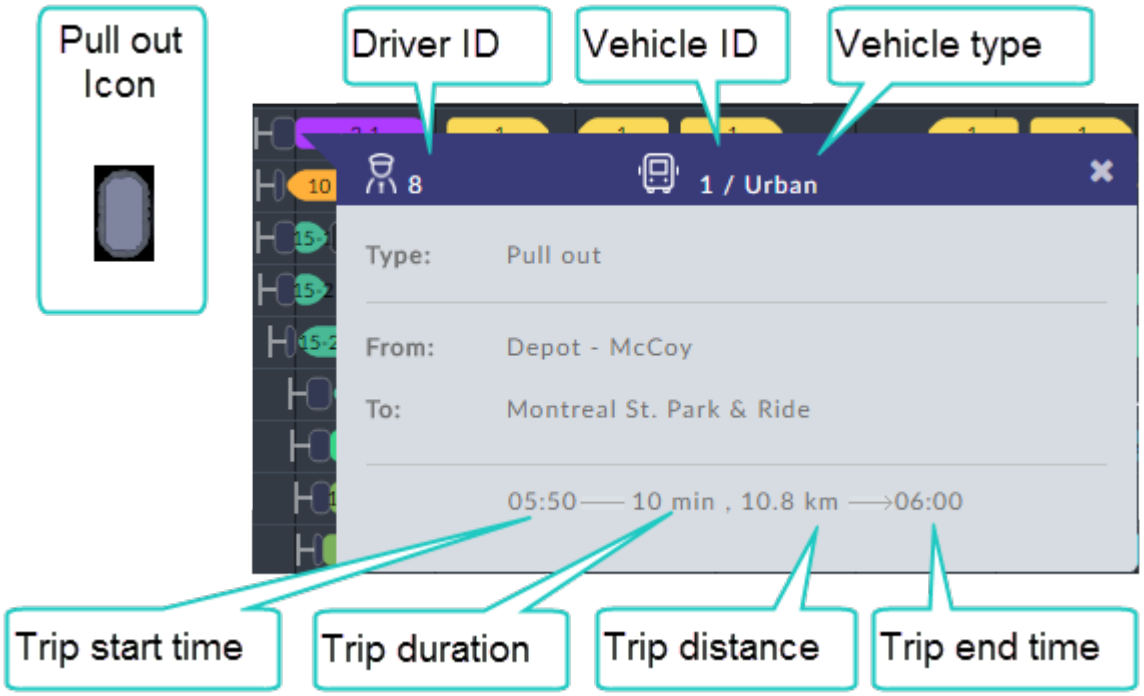


Table 7-4: Pull out information box

Information Box Item	Description
Type	Information box type - Pull out
From:	Pull out location - typically a depot
To:	Origin of first service trip

Pull in

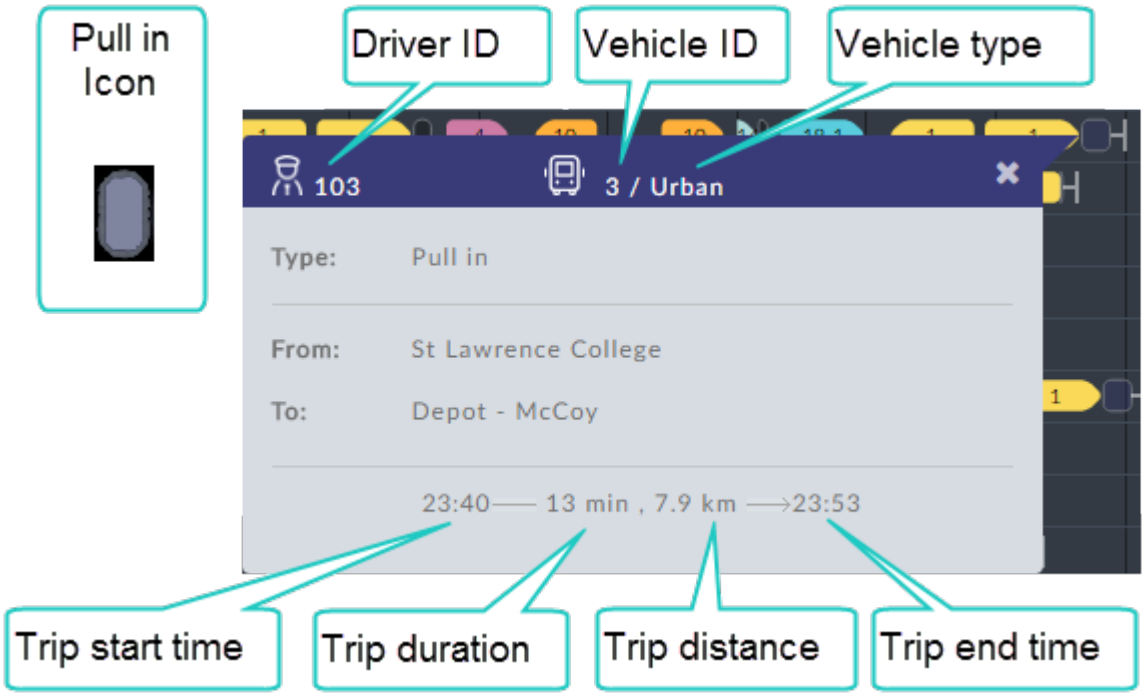


Table 7-5: Pull in information box

Information Box Item	Description
Type	Information box type - Pull in
From:	Pull in location - typically the end point of a service trip
To:	The final location of the vehicle at the end of the day, typically a depot.

Pre-trip

The Pre-trip element only appears at the beginning of a vehicle work day. It provides for all required vehicle preparation by the driver before he moves the vehicle.

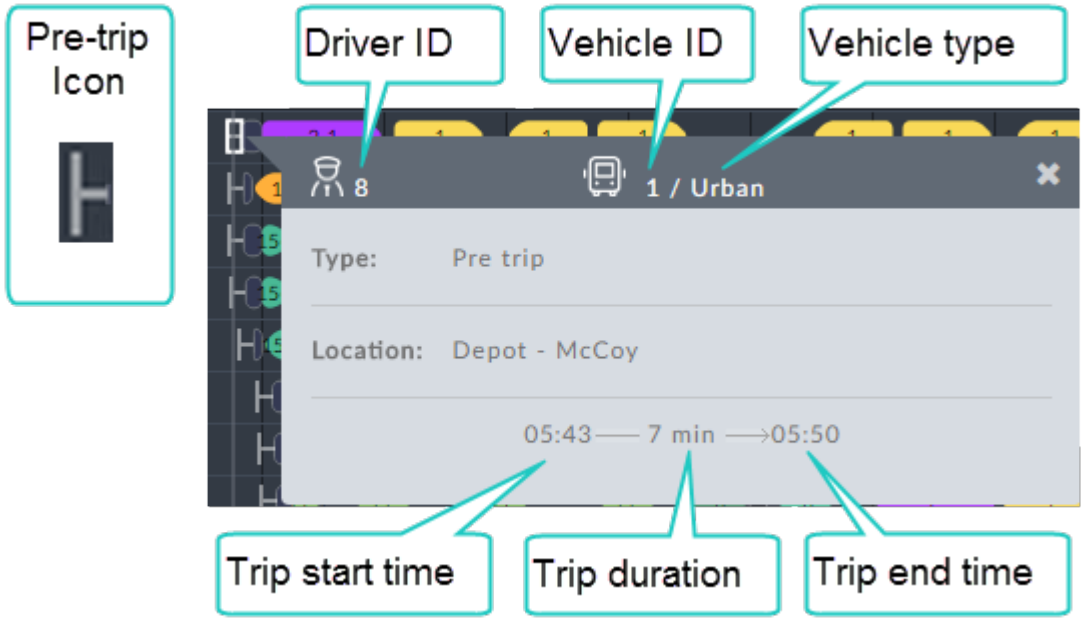


Table 7-6: Pre-trip information box

Information Box Item	Description
Type	Information box type - Pre trip
Location	Work day departure point, typically a depot

Post-trip

The Post-trip element appears at the end of a vehicle work day. It provides for all required vehicle activities by the driver after parking the vehicle and before going off-duty.

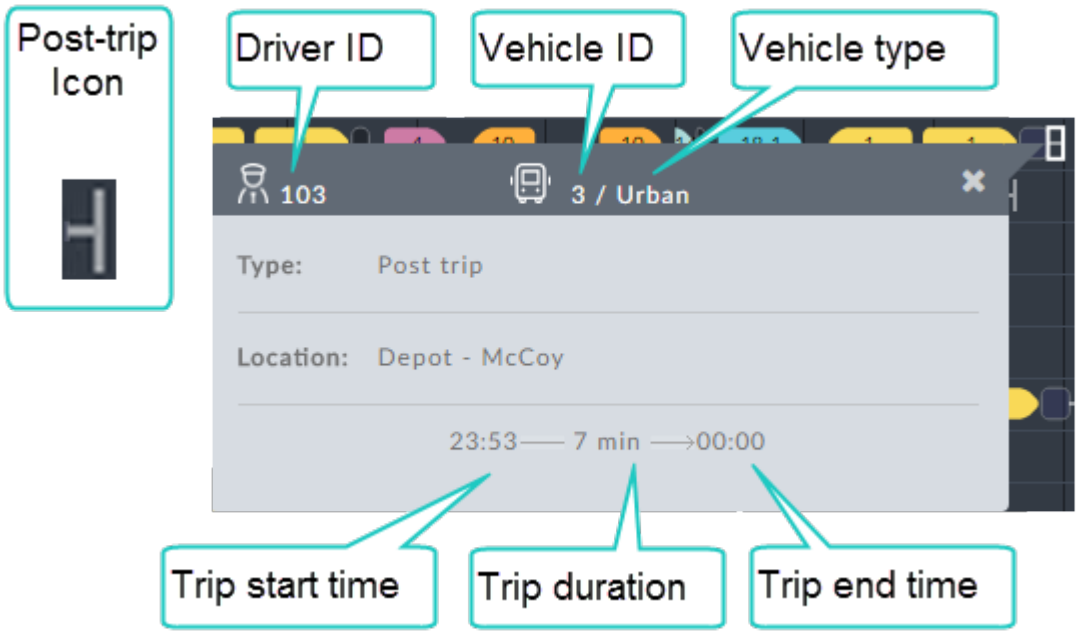
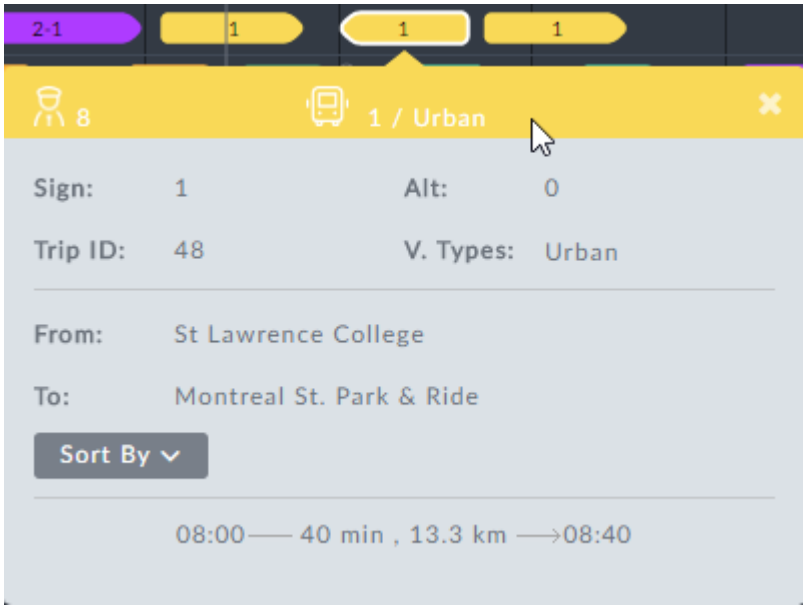


Table 7-7: Post-trip information box

Information Box Item	Description
Type	Information box type - Post trip
Location	Work day termination point, typically a depot

Sorting the Vehicle Gantt

Recall the service trip information box:



Clicking the **Sorted By** button opens the following pick list:

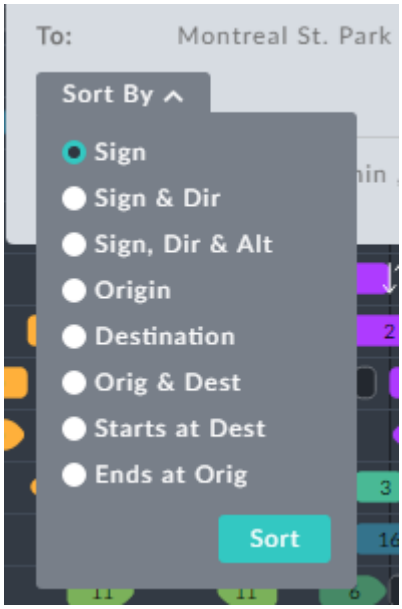


Figure 7-9: Display sort options

Explanation ...TBD

Driver Gantt

Driver Gantt Overview

Like the Vehicle Gantt, the Driver Gantt also contains a vast amount of information. We start with an example:

Figure 7-10: A typical Driver Gantt

For the Driver Gantt, the left hand numbering is for drivers. Thus, each numbered row on the Gantt shows the work day for one driver. otherwise the graphic elements are very

similar to those used in the Vehicle Gantt. The emphasis in this section will be on the element specific to the Driver Gantt or elements having a different meaning.

The following graphic elements are the same as those for the Vehicle Gantt:

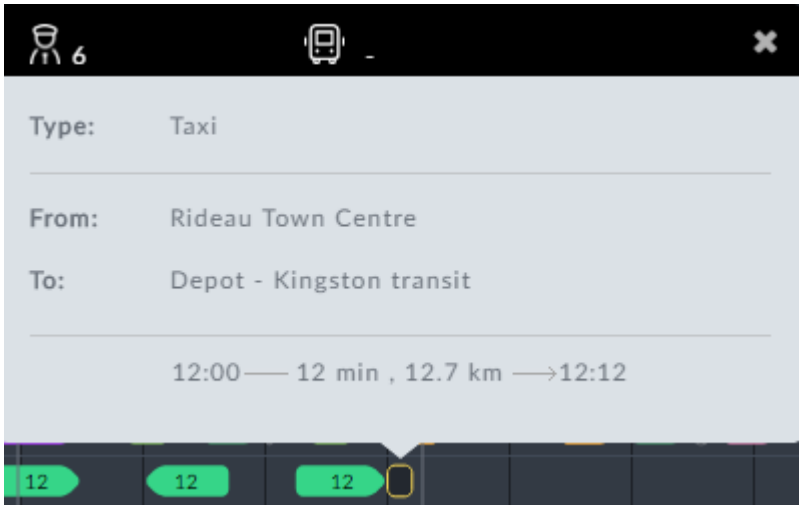
- Service trip
- Pre-trip and Post-trip
- Pull out and Pull in
- Deadhead

Up and down arrows have a different meaning in the Driver Gantt: Here they indicate a **vehicle changeover** for the same driver. The changeover may be separated by other events, as we will see below.

There are two additional elements:

When a driver completes a service trip, he may be required to leave his vehicle and then go to a different location for his next trip or even to take a break. To get there, he may require transport such as a taxi or a shuttle.

The **Taxi** icon denotes the driver movement. It looks similar to a Deadhead icon but it has a thin yellow frame. Left clicking it opens its information box:



The box indicates that a taxi or a shuttle is required.

Note: The use or otherwise, of Taxi icons is determined in the Preferences. See TBD.

The second additional graphic describes a **Split**:

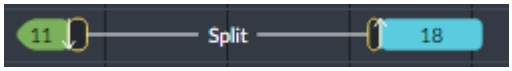


Figure 7-11: Split example

Note: The part of the driver's duty before a split is called his **first stretch** and the duty following the split, his **second stretch**.

To follow the narrative of **Figure 7-11**, we need to open the information box of each constituent element in order from left to right:

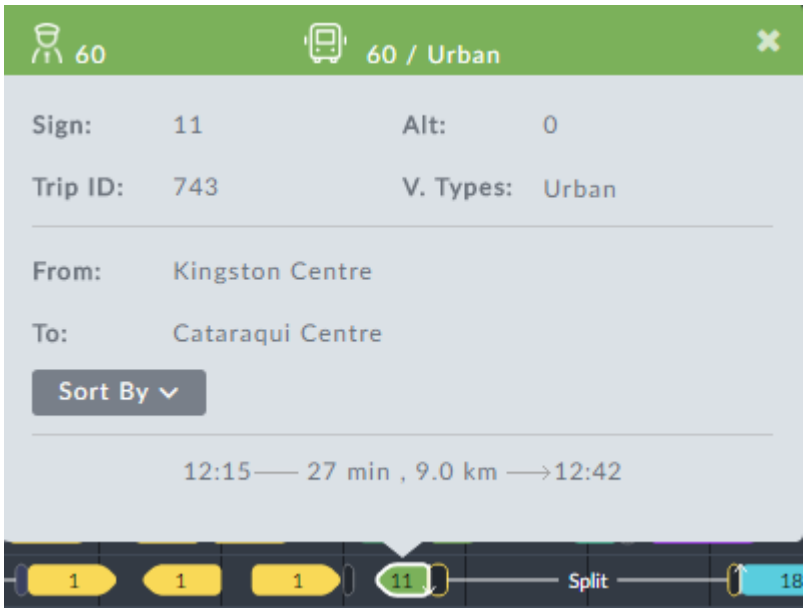


Figure 7-12: Last service trip of first stretch completed prior to split

The driver with ID as shown, has completed the service trip of **Figure 7-12**. In **Figure 7-11**, following the service trip element there is a down arrow. The driver has left the vehicle as first part of a changeover. The next element is a Taxi icon showing that the driver requires transport as shown in **Figure 7-13**:

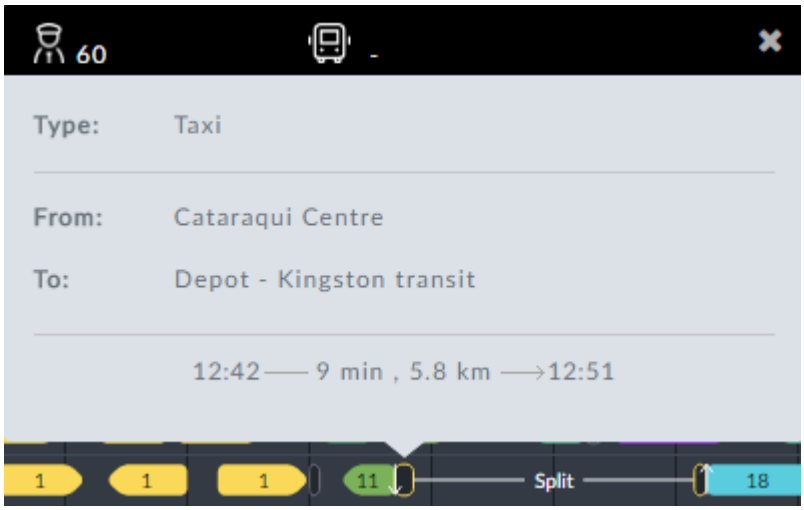


Figure 7-13: Taxi taken before split

Having arrived at the **To:** location, the driver goes off duty as shown in the split break. The driver's split break details are shown in the split break information box:

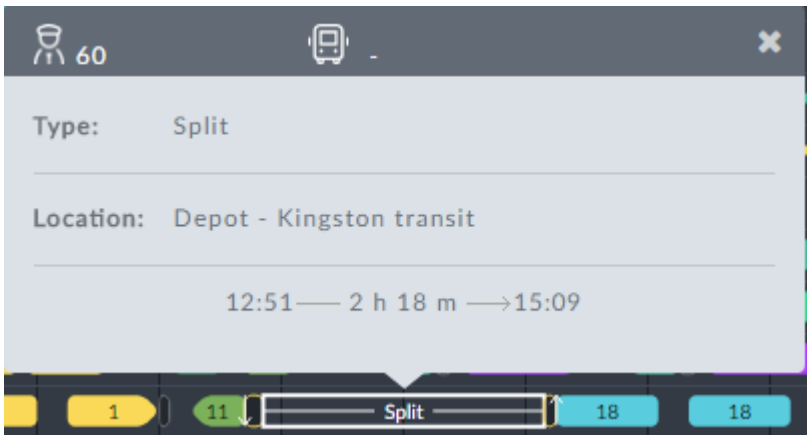
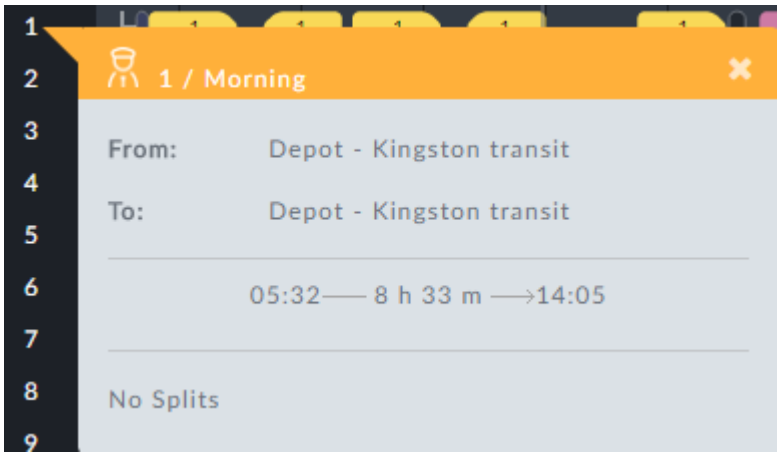


Figure 7-14: Split break information box

At the end of the break shown at the bottom of **Figure 7-14**, another Taxi icon is displayed indicating a requirement for transport to take the driver to his next duty trip. An up arrow shows the driver taking over the vehicle for the next service trip, the second part of his changeover. At this point, the procedure flow should be evident and we will not show all of the information boxes.

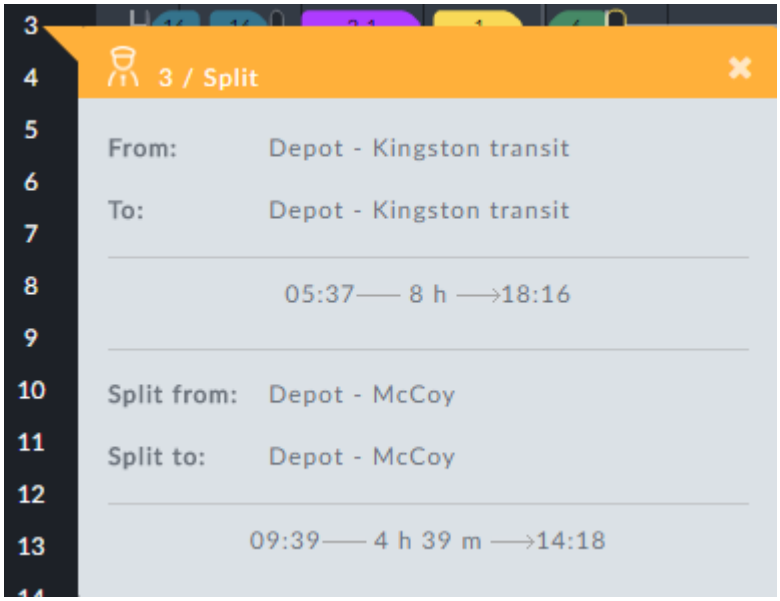
As for the Vehicle Gantt, each row number in the Driver Gantt has an information box. For drivers there is a difference. Left-clicking row 1 shows the following information box:



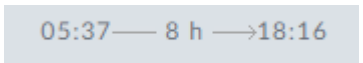
The only new item is the No Splits indicator, showing that the duty in the line above is continuous.

Note: The **Duty Type** shown is Operator defined.

If we left-click row 3, which has a split, the information box is different:



We have already encountered the contents of this box in the split narrative above: The driver comes on duty at the **From:** location and finishes his day at the **To:** location (often the same), starting and finishing as shown:



The worked hours shown in the middle are total worked hours less the split hours.

The lower **Split from: / Split to:** section shows the split break period only:

09:39—— 4 h 39 m ——→14:18

At this point, it is quite straight forward to follow the work day on the Driver Gantt for any driver.

The Driver Gantt in Detail

In this section we look at the driver specific information boxes in detail.

Workday Overview for a Driver

Left-clicking a row number pops up a work day overview for the driver:

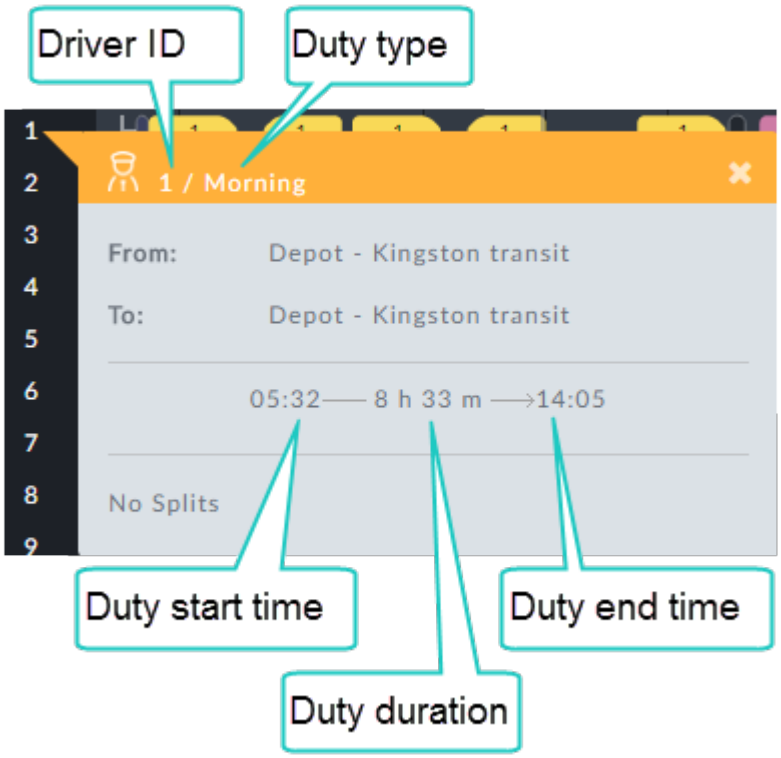


Figure 7-15: Workday Overview - no splits

Note: The **Duty Type** is Operator defined.

If the day's work is split by a rest period, the information box has extra details:

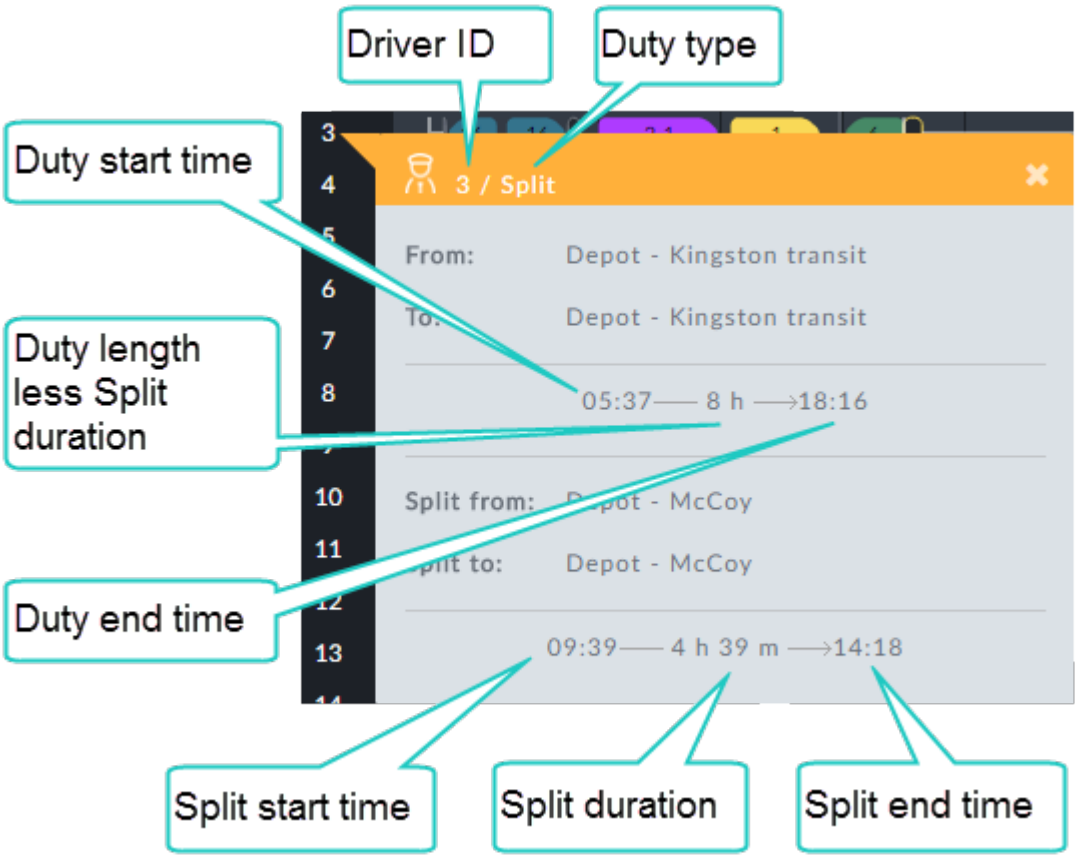


Figure 7-16: Split workday Overview

Table 7-1: Row overview information box

Information Box Item	Description
From:	Start location of the driver at the beginning of the work day
To:	The final location of the driver at the end of the work day
Split from:	Split start location
Split to:	Split end location

Split Information Box

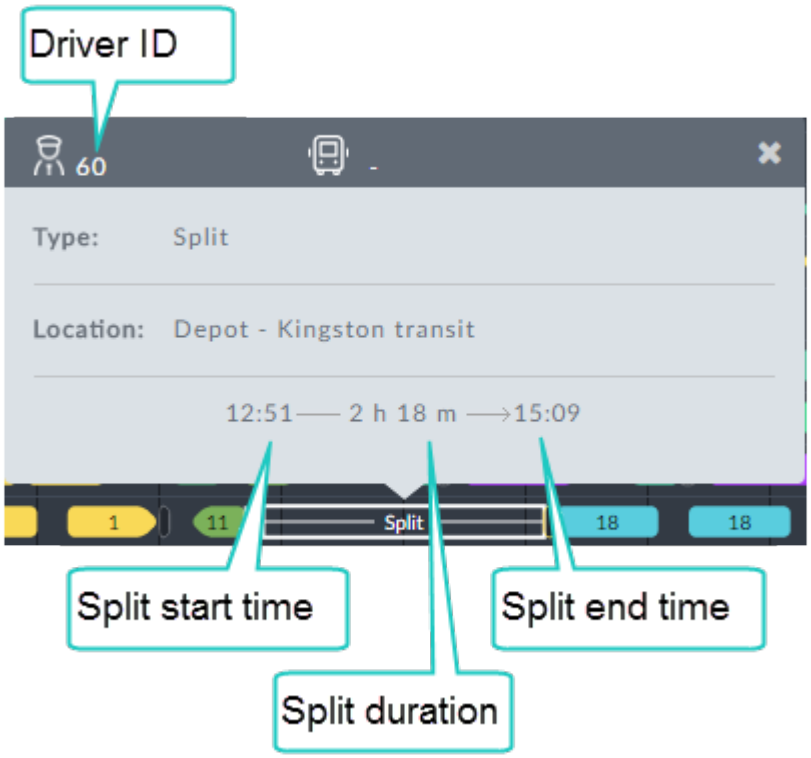


Table 7-2: Split information box

Information Box Item	Description
Type	Information box type
Location:	Split location - typically break location

Taxi

Recall that, when a driver completes a service trip, he may be required to leave his vehicle and then go to a different location for his next trip or even to take a break. To get there, he may require transport such as a taxi or a shuttle.

The taxi icon is used to represent this driver movement.

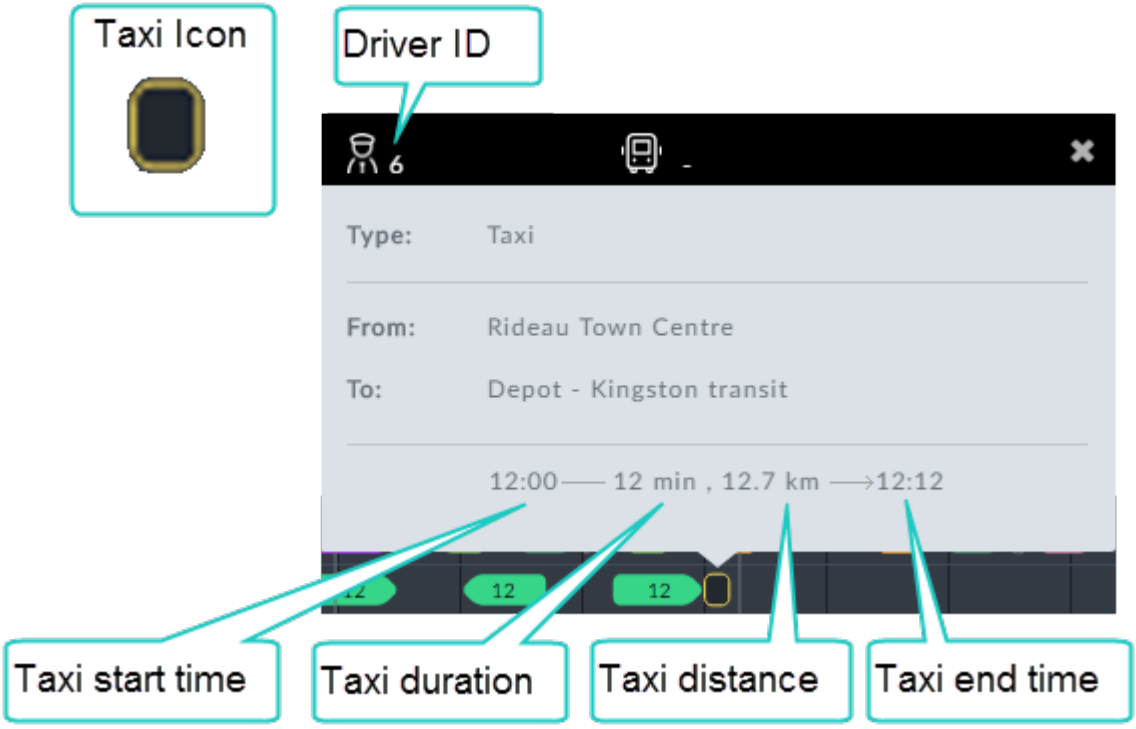


Table 7-3: Taxi information box

Information Box Item	Description
Type	Information box type -Taxi
From:	Taxi start location
To:	Taxi end location

Chapter 8: Setting Preferences and Optimization

Scope of this Chapter

Schedule optimization is always with respect to the schedule preferences - even if they are default preferences as might be the case in first optimization.

In this chapter therefore, we commences with technical background information about Optimization.

We then proceed with a detailed discussion about the Preferences. The Preferences are for most part, elaborate forms (or templates) required to configure a complete topic. It is quite a different world from configuring preferences for common "apps" or even more complex programs like MS Word or Excel.

Having saved your preferences, you then optimize to see their effect on the KPIs.

The preferences that you set are cumulative. There is however, a method for "throwing away" unwanted preferences for a specific topic.

Optimization Options

The Optibize Options List

The **Optibize** button is used to initiate an optimization run for the schedule. The processing time for an optimization depends among other things, on the size of the schedule but is generally of the order of seconds to minutes.

You can choose to optimize the Vehicles, the Drivers (Duties) or both using the optimization settings buttons before clicking **Optibize**.

The button opens a drop-down choice list of optimization settings:

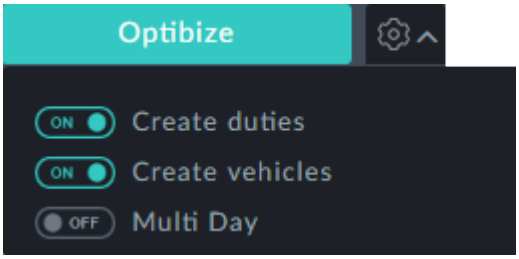
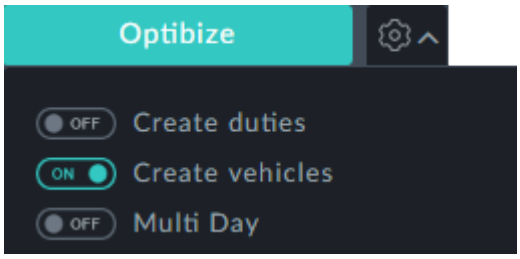


Figure 8-1: Default options for optimization

By default, the optimization will use the two checked items.

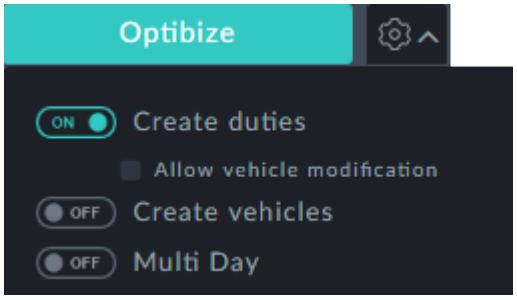
Using the Optibize and Associated Preferences buttons

Create vehicles



Create vehicles creates a vehicles-only schedule without a duties assignment. You can use this option for checking the minimum number of vehicles required for the schedule or for separately planning first the vehicles and then the duties.

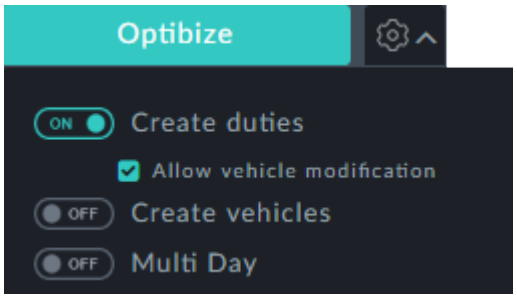
Create Duties without the Allow vehicles modification option



This option creates a Duties schedule based on a given Vehicle schedule. The Duties will be changed whereas the Vehicles will remain the same as in the schedule displayed currently on the Vehicle Gantt.

Note: A Vehicles schedule must always be created prior to creating a Duties schedule.

Create duties with the Allow vehicles modification option



In this case, Optibus OnSchedule™ performs iterative procedure follows:

» Starting from the current Vehicles schedule (displayed on the Gantt), the system creates a Duties schedule. It may change the Vehicles schedule to improve the Duties schedule.

» Using the adjusted Vehicles schedule, the system rebuilds the Duties schedule as in the previous step.

The foregoing process of

Use current Vehicles schedule
⇨ Create Duties schedule
⇨ Modify Vehicles schedule
⇨ Make modified Vehicles schedule the current Vehicles schedule

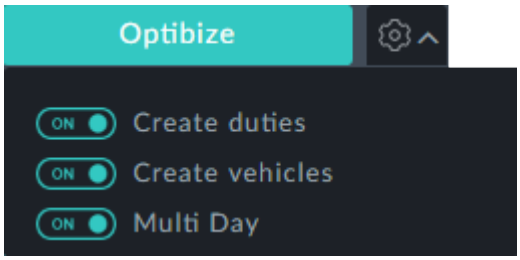
is repeated until best possible results have been achieved. The complete iterative process takes place in a matter of seconds.

Create vehicles and Create duties together

This is the default case shown in **Figure 8-1** above.

Both the Vehicles and Duties schedules are created in the iterative process described in the previous section, **Create duties with the Allow vehicles modification option**.

Multi day



Turning the **Multi day** option on together with any of the other options described above makes the optimization run for each day of the week in the current Dataset.

Preferences Organization and Management

Overview of the Preferences Window

The elements of the Preferences window are shown in **Figure 8-2** below:

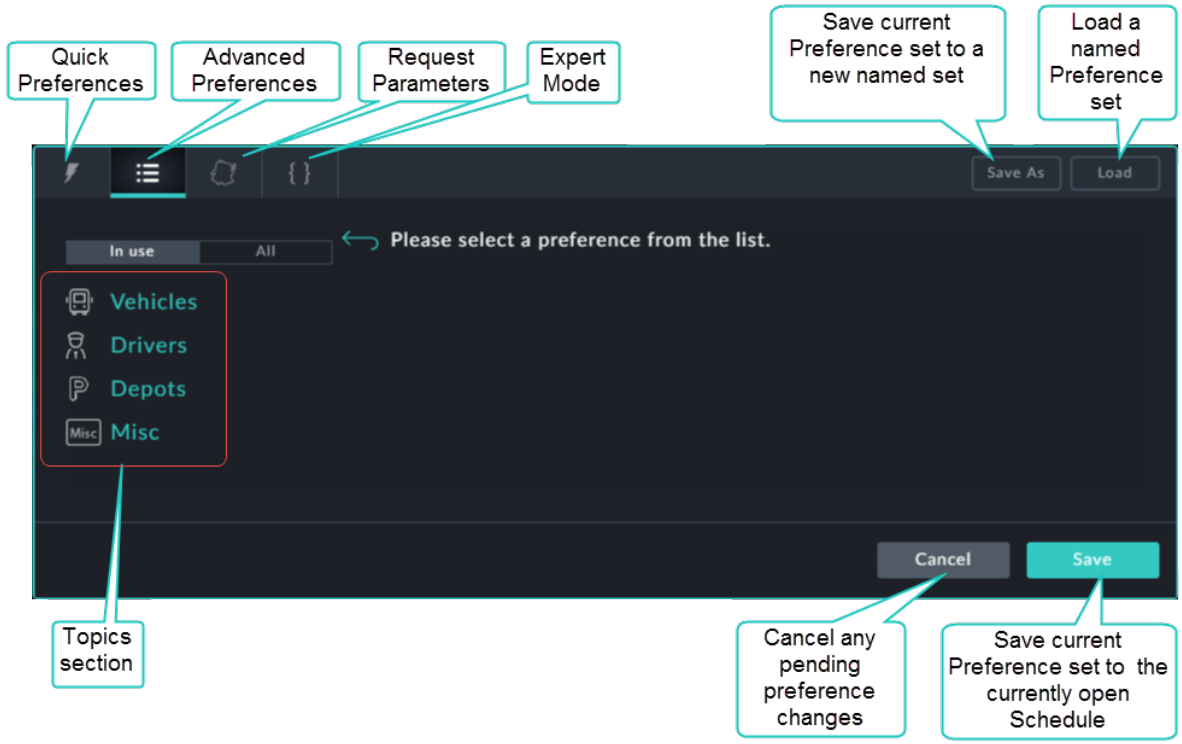


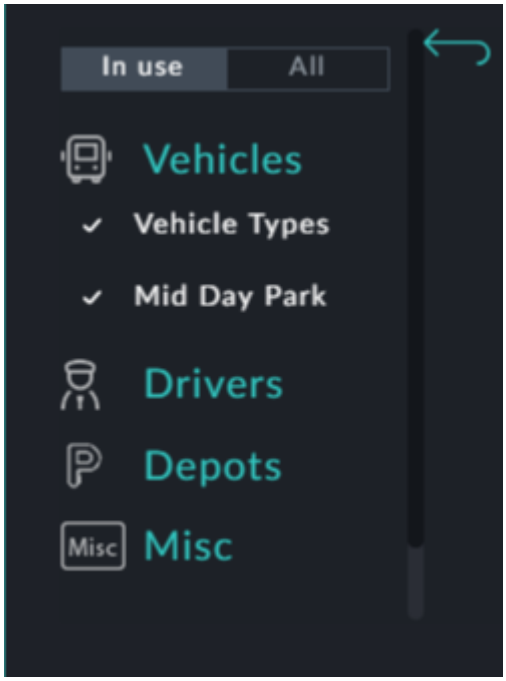
Figure 8-2: Preferences - opening window

Clockwise, from the top left corner of **Figure 8-2**, the call-outs are detailed below as follows:

Preference window item	Cross Reference
Quick Preferences	**Quick Preferences**
Advanced Preferences	**Topic Section Grouping**
Request Parameters	**System Parameters**
Expert Mode	**Expert Mode Management** and also **Using Expert Mode**
Save current Preference set to a new named set	**Save As and Load**
Load a named Preference set	
Save current Preference set to the currently open Schedule	**Save and Cancel**
Cancel any pending preference changes	
Topics section	**Topic Section Grouping**

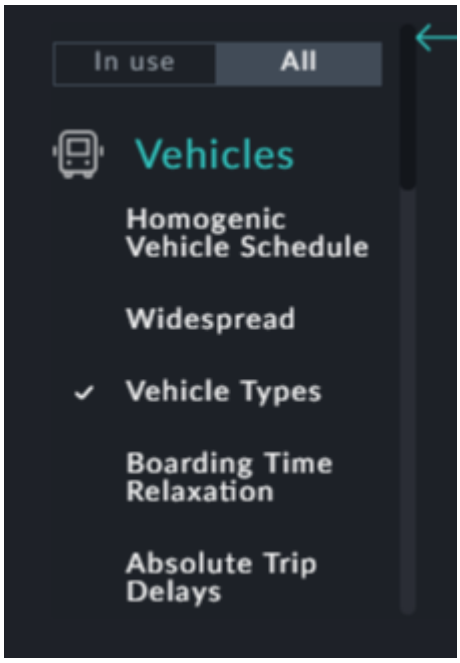
Topic Section Grouping

The Preferences are organized into four topic groups, Vehicles, Drivers, Depots and Miscellaneous. The fourth group is a "catchall" to cover items that do not fit into the first three groups. Look at the preferences opening window, each of the five topics shown is a toggle. For example, click **Vehicles**:



These are the Vehicle topics in use for the current open schedule. This presentation is ideal for schedule maintenance based on modifying pre-installed or your own existing preferences.

To see all of the available Vehicle topics, click the **All** button:



Topics in use are checked. The topic list runs of the screen and you will need the scroll bar to see them all.

Note: In practice, your Optibus OnSchedule™ system will be configured with a set of pre-loaded preferences. You will not need the **All** button unless you need to add a completely new preference.

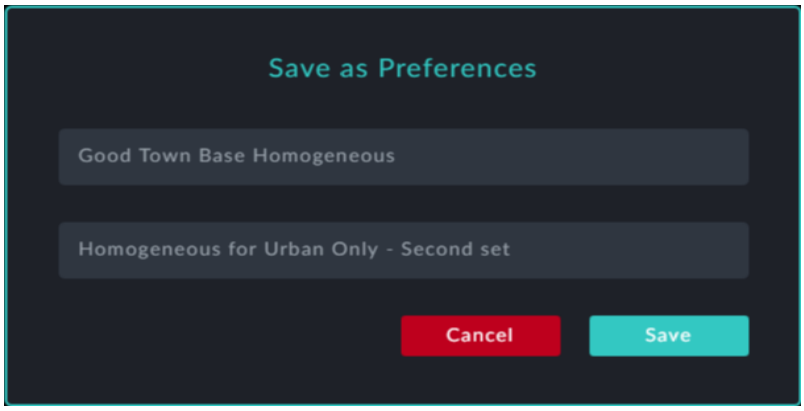
Clicking the **Vehicles** restores the window to the state of **Figure 8-2**.

The foregoing pattern applies to the other three groups.

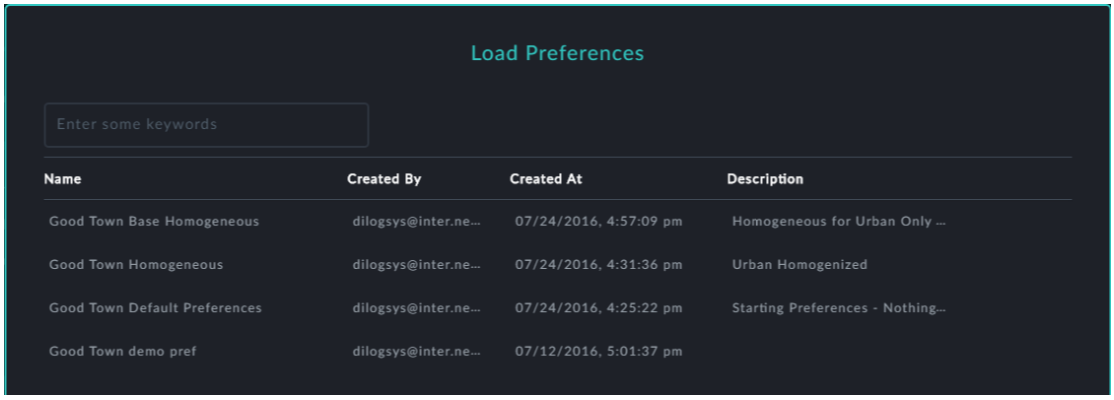
Preferences Window Tool Bar

Save As and Load

You can save your preferences with **Save As** to a named set inside the Dataset for subsequent retrieval with **Load:**

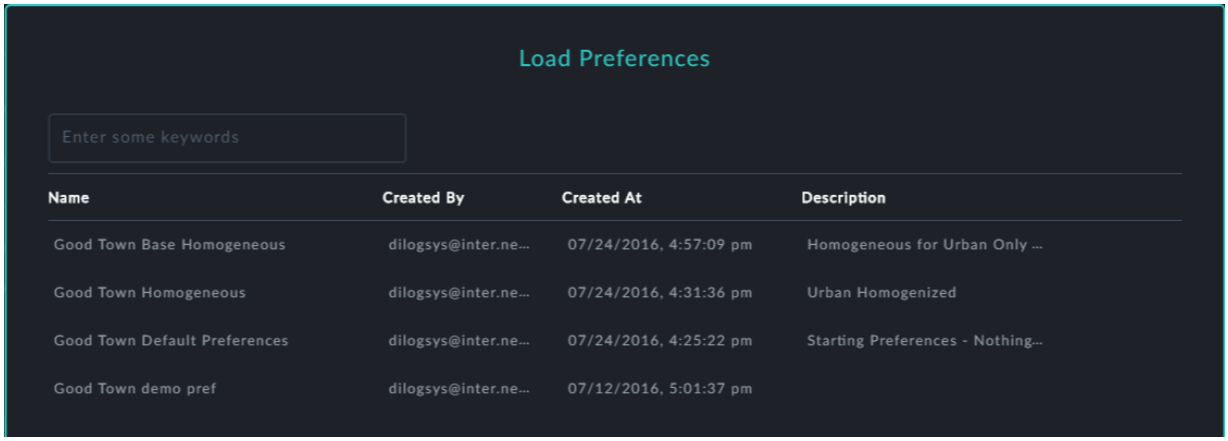


Tip: If you intend to carry out extensive "What if?" exercises, use a systematic naming scheme and a meaningful description. Your saved preferences are stored in the Dataset. If you use **Load** to load them later, you will see this:



If you intend to carry out extensive "What if?" exercises, use a systematic naming scheme and a meaningful description.

Your saved preferences are stored in the Dataset. If you use **Load** to load them later, you will see this:



You can now see that without systematic naming scheme with good descriptions, matters can get out of hand very quickly.

Expert Mode Management

Clicking the expert mode button shows your preferences in source (JSON) format.

This **Expert** provision also appears at the topic level. It is primarily intended for the use of Optibus Professional Services to -

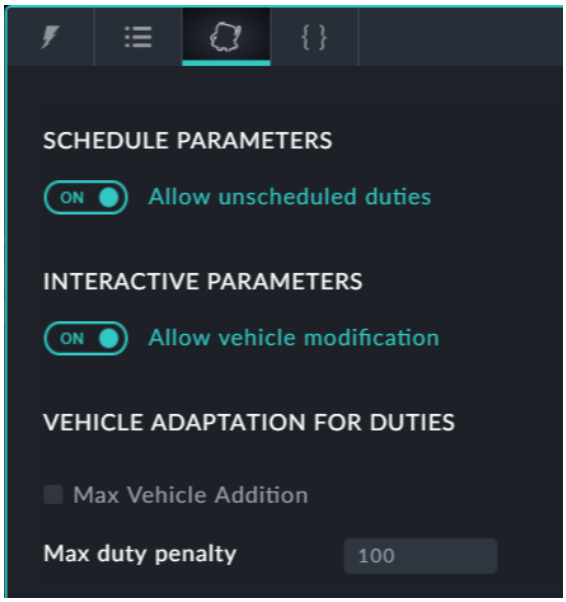
- **Add urgent custom features with a turn around of hours instead of days or weeks.**
- **Provide rapid fixes to problems in the field**

It can also be used by customers having the necessary programming expertise.

See **Using Expert Mode** for further details.

System Parameters

The button opens a set of optimization system parameters that configure the optimization process at the system level.



Schedule Parameters

The Duties in a schedule imported from source files, may not be entirely consistent.
Checking **Allow unscheduled duties** prevents errors from being displayed. Instead, the Duties are placed in the Stack for manual correction.

Interactive Parameters

TBD

What is this for?

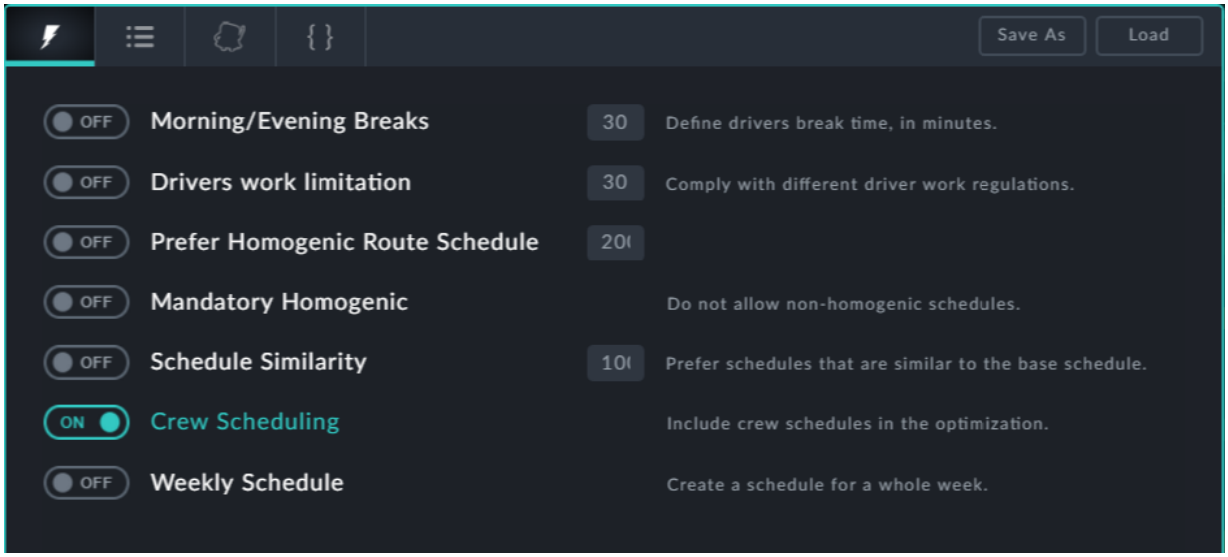
Vehicle Adaptation for Duties

TBD

What is this for?

Quick Preferences

The button opens a set of quick preferences:



These are frequently used preferences that might be helpful in setting up "What if?" demonstrations.

What is this for?

Save and Cancel

The **Save** and **Cancel** buttons appear in every Preference dialog in the system. At the level of the general Preferences window, the **Save** button saves all of your preferences to the current open schedule. In the context of a specific Topic dialog as we shall see in the next section, the **Save** button saves the open preference only, to the current open schedule.

The **Cancel** button discards any pending preference additions or changes again depending on context. In a particular Topic dialog, it will discard that topic only. At the level of the general Preferences window, it will discard any changes you made since opening the Preferences window.

Topic Dialogs

> **Note:** The purpose of this section is to demonstrate the way in which preferences are managed, rather than details about the specific cases chosen for our examples.

The method of setting preference parameters in the system is somewhat unconventional. We saw several examples in the Quick Tour, **Using Preferences to Optimize the Schedule**. For illustrative purposes, we will continue to use the Quick Tour schedule.

Opening a Pre-loaded (Used) Preference

Open the Depots Capacity preference:

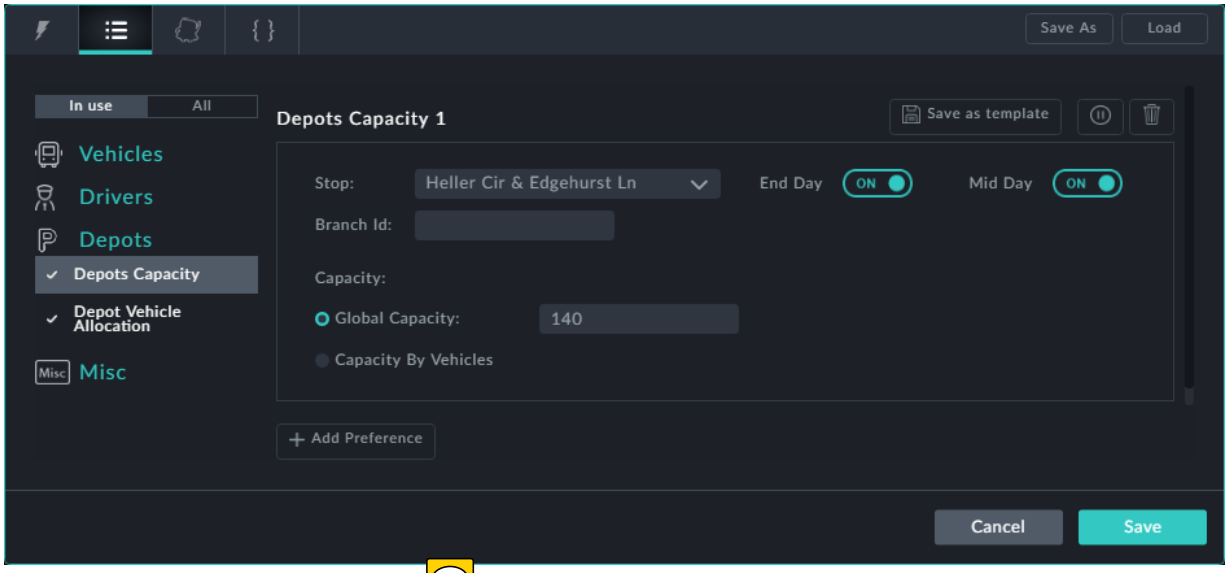
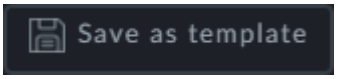


Figure 8-3: Depot Capacity preferences

Before looking at the preference details, notice the following functions:

1. Clicking the Preference name (Depot Capacity 1) makes it editable. You can change it at your convenience.

2. The **Save as Template** button 

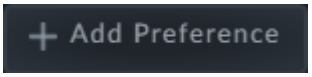
stores the preference along with any data you have entered for later use. See **Save as template and Save** to see

how it is done and then **Load Template** to see how to recover the preference for later use.

3. The button is an disable/enable toggle, which allows you to disable the preference without deleting it. See **Enable and Disable**.

4. The button deletes the preference.

> **Caution:** In a new installation, be very careful with this button for a preference containing pre-entered data. If you do inadvertently click it, click the **Cancel** button, and return to Preferences from the main window.

5. The **Add Preference** button 

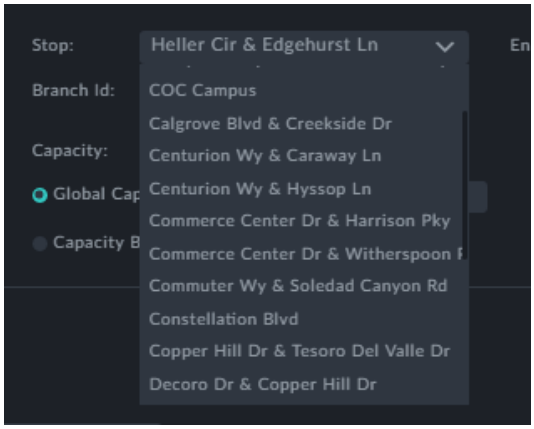
creates a duplicate preference with a new name and no pre-entered data. See **Add Preference** for further details.

User Interface Elements

The user interface for most part, uses entry fields familiar to you from common Web applications. We will review them using the Depot Capacity example and other examples from the Quick Tour.

Look at the Depot Capacity preference again (**Figure 8-3**):

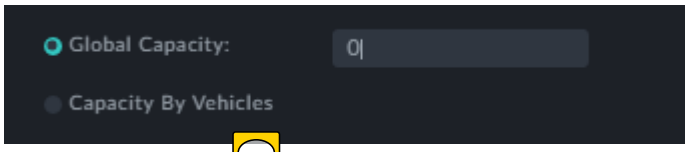
Stop is a drop-down pick list:



End Day and **Mid Day** are switches that are toggled On or Off with a mouse click.

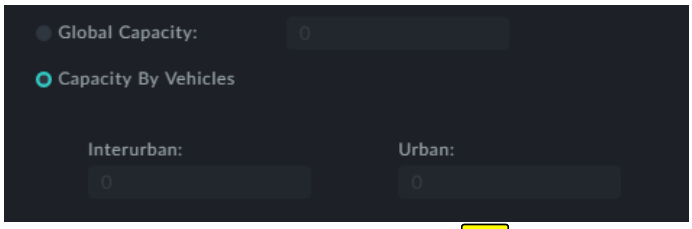
Branch ID is a simple text string.

You may be asked to choose one item from a bulleted list:



The default choice is highlighted in blue. The associated numeric field may or may not be protected against entry of non-numeric text, so do take care.

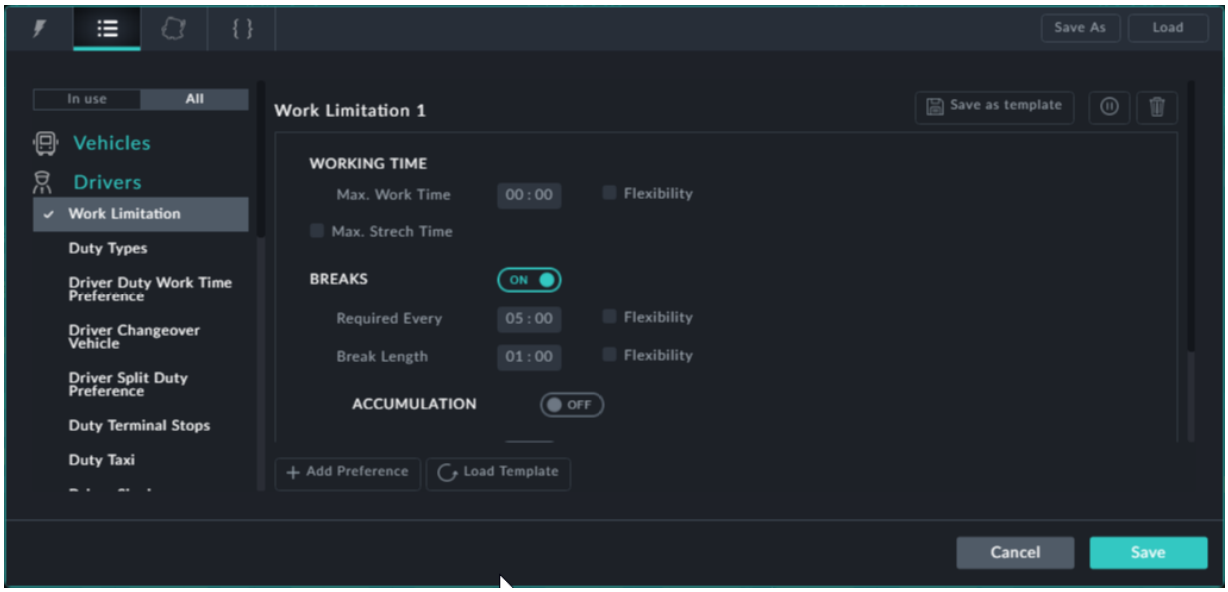
If you choose Capacity by Vehicles, a further dialog opens:



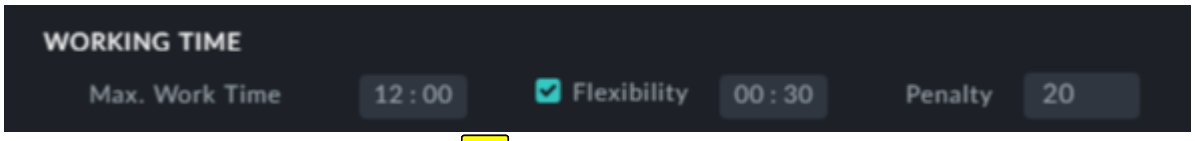
You are required to enter the capacity by vehicle type.

> **Note:** These vehicle types are not "hardwired" into the system. If you have additional or different vehicle types, this preference will be modified to accommodate them. This is an excellent example of the flexibility of the system in meeting different Operator requirements.

Our next example is taken from the Quick Tour, Work Limitation for drivers (See Quick Tour **Driver Work Limitations** and Preferences, **Work LImitations**). Here is the preference window:



The new item is the **Flexibility** field. If you open it for the first item (Max. Work Time), you will see this:



The use of Flexibility was touched on in the Quick Tour and is explained in detail TBD.

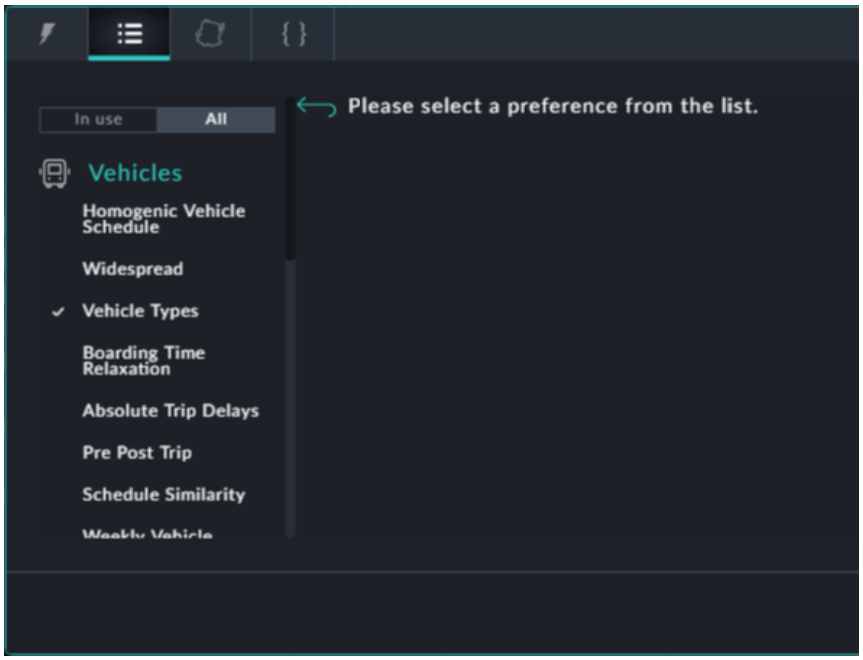
It is often possible to set up **multiple preferences pages** for a given topic. If you open Duty Types, you will see that there is a a set of preference values for each of 10 duty types. Multiple preferences are available wherever you see the **Add Preferences** button.

Note: Some preferences do not have the **Add Preference** button. In such cases, only one instance of the preference is allowed in the system. See for example, **Driver Changeover Vehicle**.

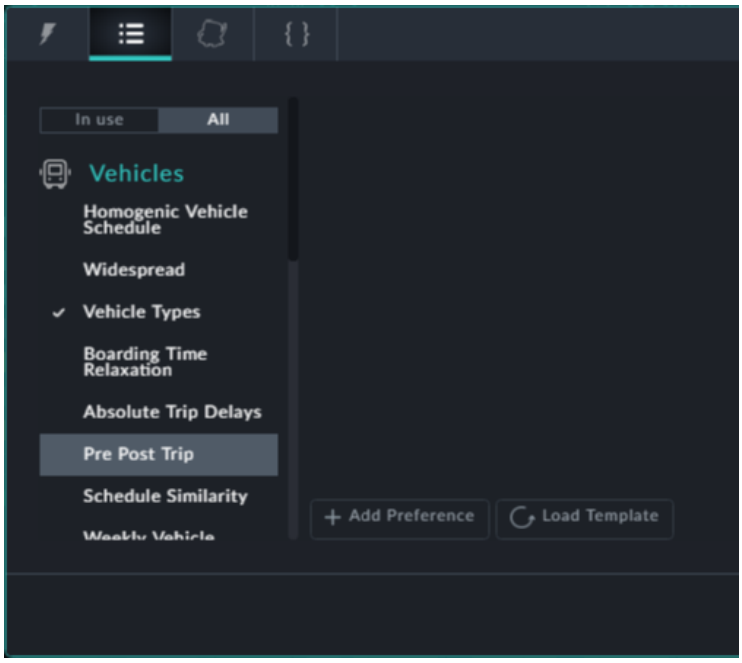
Creating a Preference from a Template

The case, **Adding Pre Trip and Post trip Elements** will be used for illustrative purposes.

We start with the Quick Tour Good Town Demo schedule, loaded and optimized. The Vehicle Gantt is shown in **Figure 3-3**. Open the Preferences window and click **All**. Notice that **Pre Post Trip** is unchecked, indicating that it is not in use:



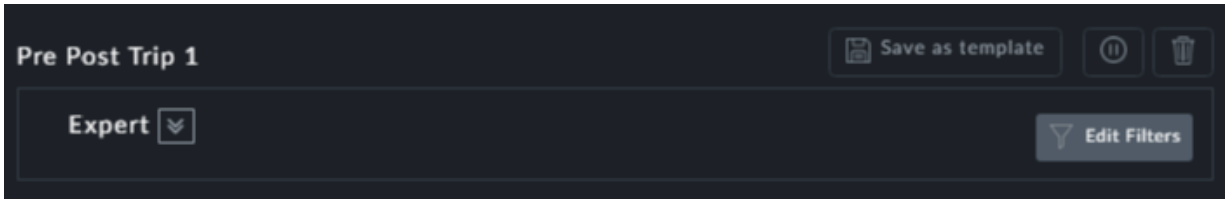
Click the **Pre Post Trip** item:



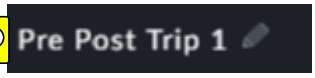
Notice the **Add Preference** and **Load Template** buttons. These will be the only available items in a newly selected unused Topic.

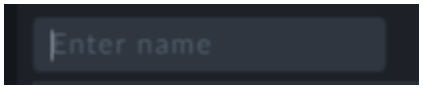
Add Preference

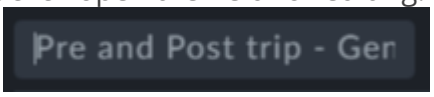
Click **Add Preference**. The right part of the display shows this:



The top left hand corner labeled

is a default name for this preference.You can rename it to something of your own choice. Mouse-over it and the pencil icon for editing 

appears. Just click open the field for editing: 

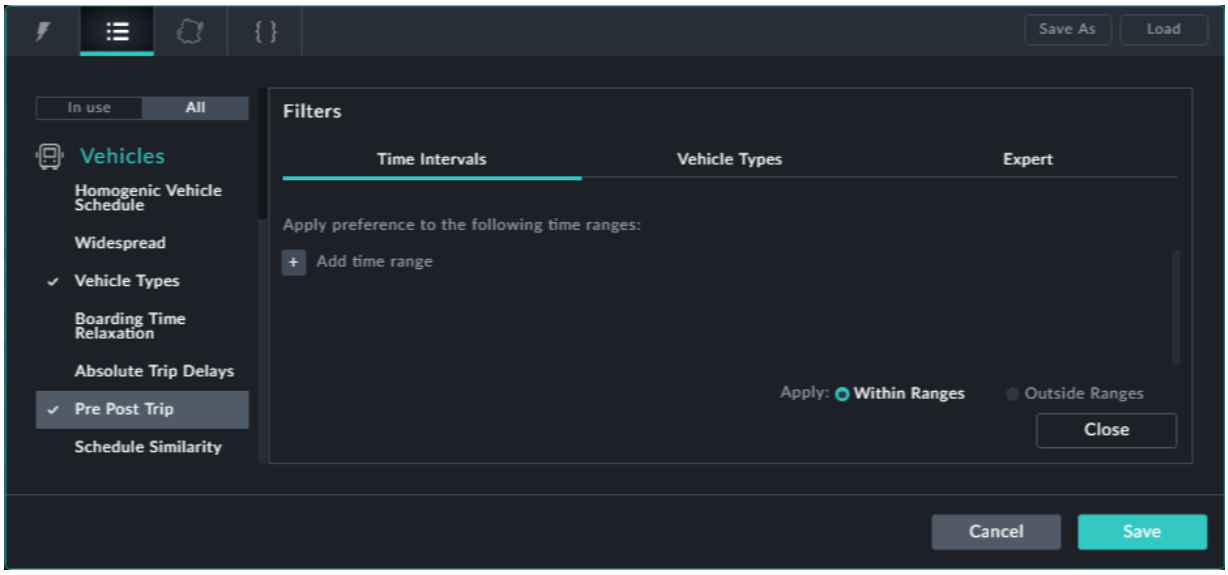
Add your own name 

and move-click the mouse elsewhere.

To use Expert mode see **Using Expert Mode**.

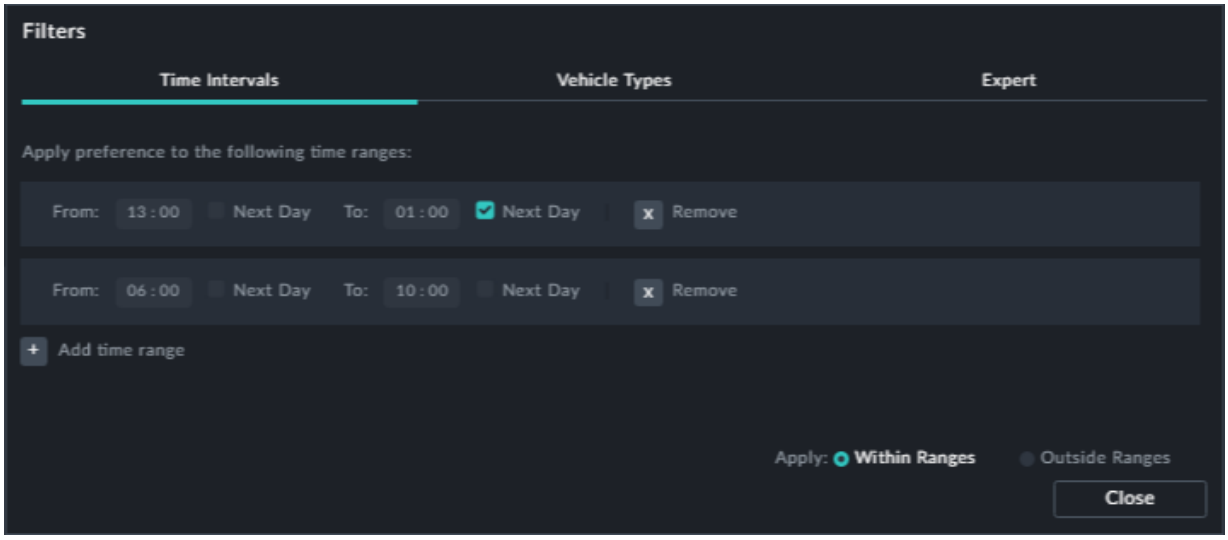
Edit Filters

This facility is always available when you add a preference:



Three filters are available:

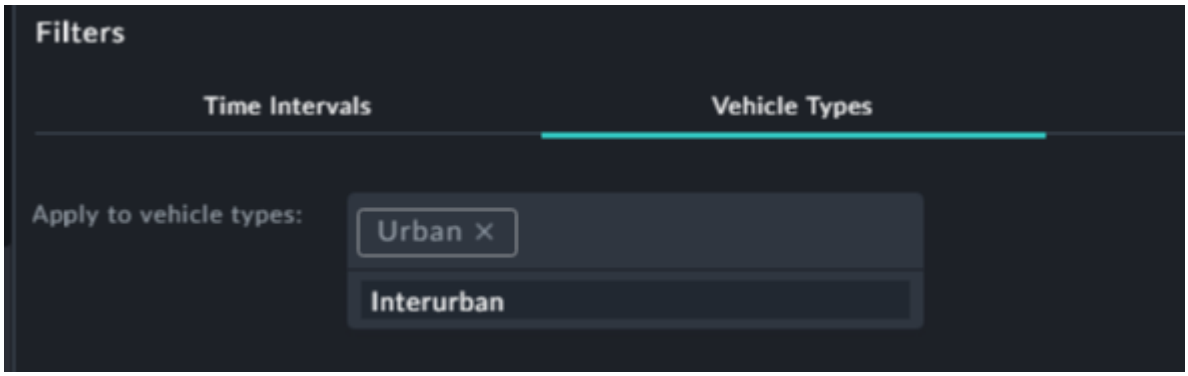
The **Time Intervals** filter allows you to limit the operation of your preference to one or more time ranges:



Notice the use of the Next Day check boxes to cater for 24 hour spill-over.

The **Within Range** and **Outside Range** check boxes reverses the range inclusion. They apply to all of the ranges that you set for the preference. In our example above, we will remove the first case (for which the Within Range/Outside Range switch will not be very sensible.) Applying Outside Range, changes from 06:00 to 10:00 to anything before and after that range inside the current 24 hour period.

We used the **Vehicle Types** filter several times in the Quick Tour, for example, in **Block Homogeneity**.



The **Expert** filter: See **Expert Mode for Edit Filters in Add Preference** for further details.

Enable and Disable

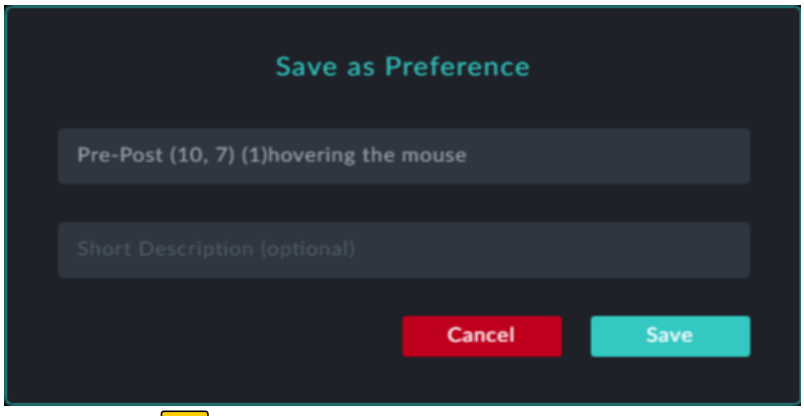
Clicking the button disables the preference to which it is attached. The preference will be grayed out. The button enables the preference. For either of these to work, you must commit the change to the open schedule by clicking the **Save** button.

Delete

The trash-can button deletes. There is no un-delete. If you're not sure about keeping or discarding a preference, disable it until you are certain.

Save as template and Save

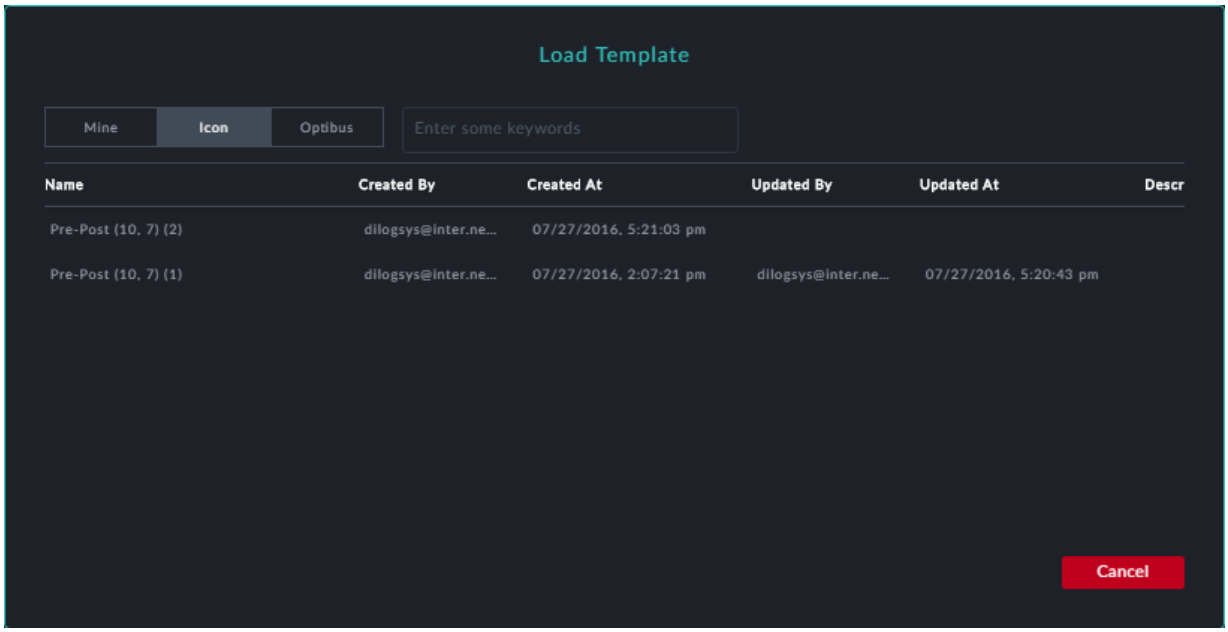
These two functions are quite different: The **Save** commits you preference to the currently open Schedule. **Save as template** works as follows. Clicking it opens a standard Save As dialog:



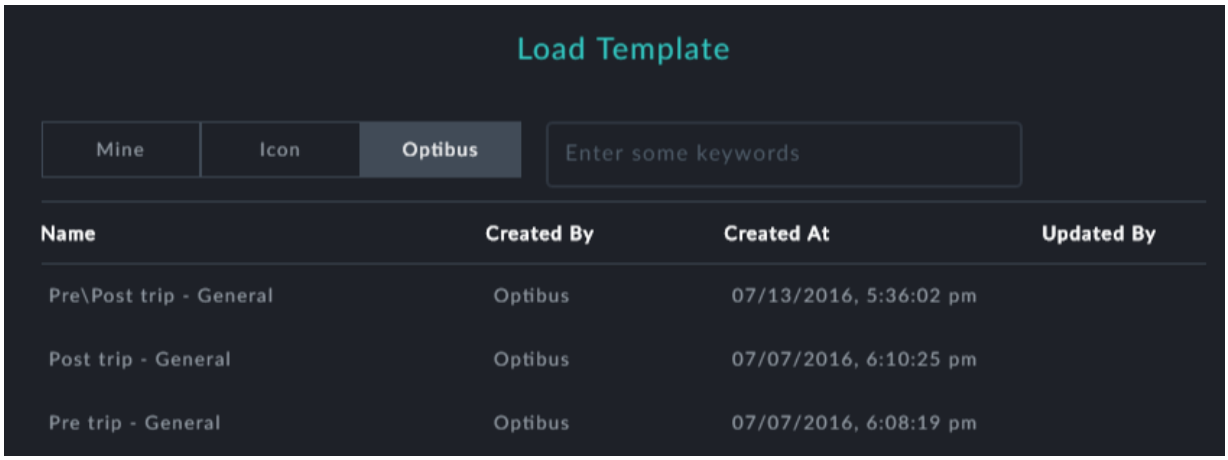
Fill it out and **Save**. It does nothing to the open Schedule. Templates, as you will see below are available at the level of the web domain in which you are working.

Load Template

Click the **Load Template** button:



The left-most tab, **Mine** is a private user area for template storage. The **I** tab is us-tomer sub-domain. It will be different for each customer. Templates entered here will be available to all template users. The important one here is the **Optibus** tab. It is a recept-acle for Optibus-prepared Templates designed to meet common requirements for the open preference topic. Here is what we have for Pre Post Trip:



Will continue with the Quick Tour example but with emphasis on the user interface rather than the application-specific function.

The User I erface for a Topic Preference

As in the Quick Tour, we choose template **Pre\Post trip - General**. Here is the pref-erence display:

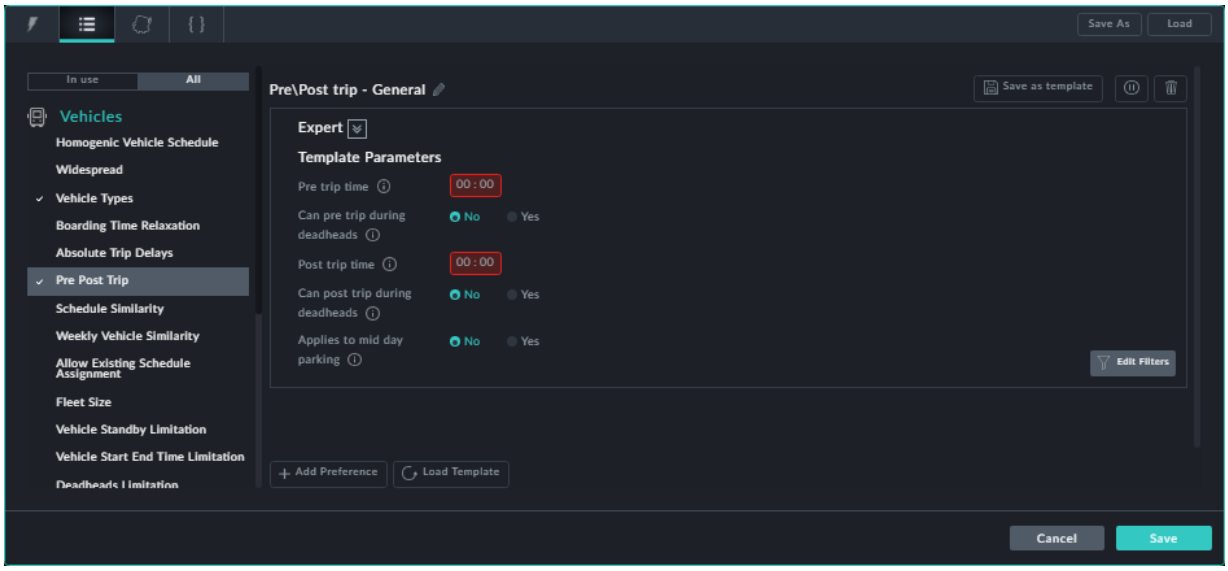
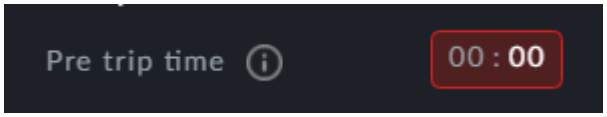


Figure 8-4: Pre and Post Trip preferences user interface

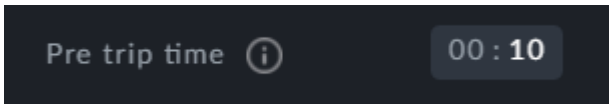
Using **Expert** mode: See **Expert Mode for the User Interface for a Topic Preference**.

Caution: Items in a red box like this 00 : 00 are mandatory for the template. If you do not enter them, the **Save** will work but the optimization will throw an "Optimization Failed" error with some technical debug information effectively telling you which fields were not filled.

The Pre trip and Post trip times use a standard hours:minutes format. Click the hours area. It is highlighted as active. We only require minutes here, so click the minutes area:



Enter 10 minutes as shown:

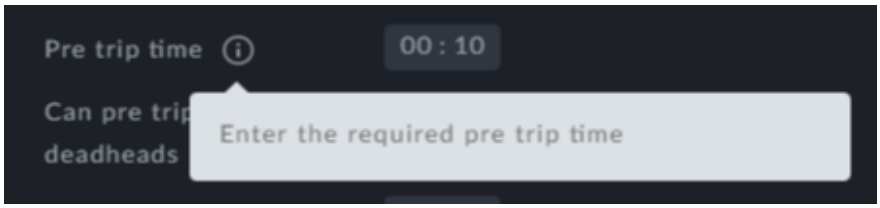


The highlighting disappears. It will not respond to non numerics; if you enter a value over 60 such as 75 it will just keep valid digits - in this case 7minutes

Change the Post trip time to 7 minutes.

The remaining radio buttons are obvious. As in the Quick Tour, we leave them as is.

There is a further detail of interest: Following each entry field there is an information tool-tip button. Clicking it for the Pre trip time gives you this:



Finally, as described in **Edit Filters** above, we can use Edit Filters to filter our preference.

Committing Preferences

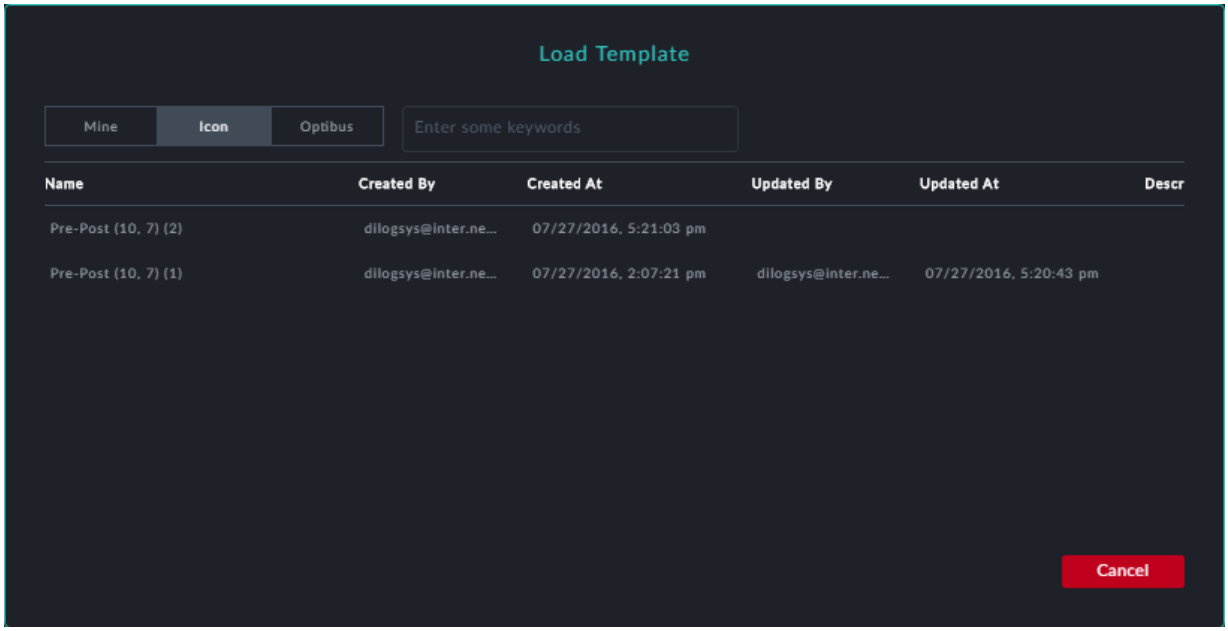
At this point, we commit our actual preference values to the schedule by clicking **Save**. They will take effect after the next optimization.

Vehicles Top

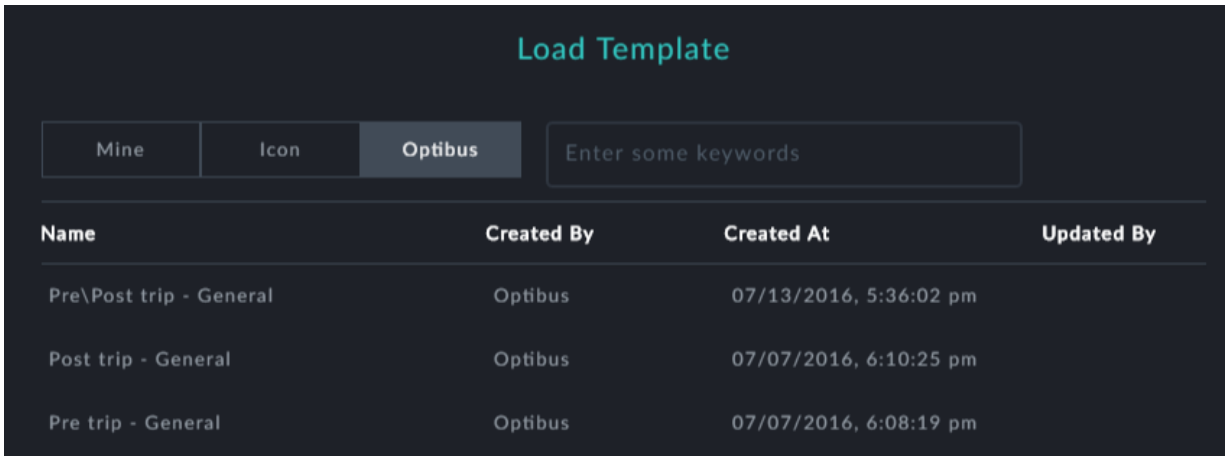
Pre Post Trip Preferences

This stuff is pre-draft

Click the **Load Template** button:



The left-most tab, **Mine** is a private user area for template storage. The **Icon** tab is a customer sub-domain. It will be different for each customer. Templates entered here will be available to all template users. The important one here is the **Optibus** tab. It is a receptacle for Optibus-prepared Templates designed to meet common requirements for the open preference topic. Here is what we have for Pre Post Trip:



Will continue with the Quick Tour example but with emphasis on the user interface rather than the application-specific function.

As in the Quick Tour, we choose template **Pre\Post trip - General**. Here is the preference display:

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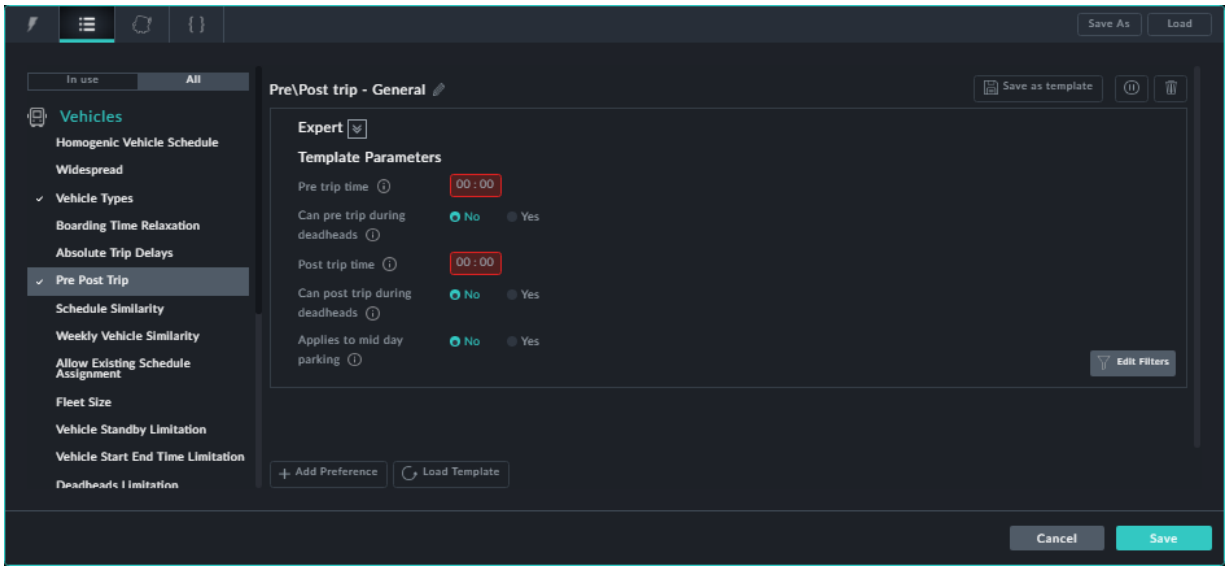
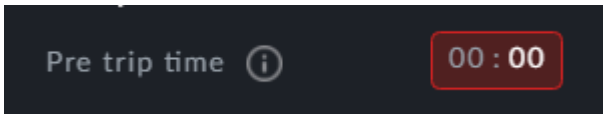


Figure 8-5: Pre and Post Trip preferences user interface

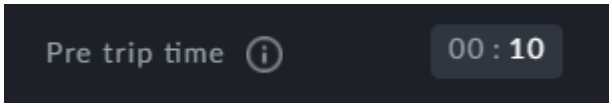
Using **Expert** mode: See **Expert Mode for the User Interface for a Topic Preference**.

Caution: Items in a red box like this 00 : 00 are mandatory for the template. If you do not enter them, the **Save** will work but the optimization with throw an "Optimization Failed" error with some technical debug information effectively telling you which fields were not filled.

The Pre trip and Post trip times use a standard hours:minutes format. Click the hours area. It is highlighted as active. We only require minutes here, so click the minutes area:



Enter 10 minutes as shown:

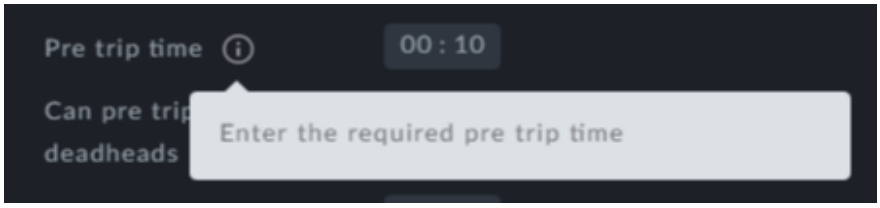


The highlighting disappears. It will not respond to non numerics; if you enter a value over 60 such as 75 it will jus keep valid digits - in this case 7minutes

Change the Post trip time to 7 minutes.

The remaining radio buttons are obvious. As in the Quick Tour, we leave them as is.

There is a further detail of interest: Following each entry field there is an information tooltip button. Clicking it for the Pre trip time gives you this:



Finally, as described in **Pre Post Trip Preferences** above, we can use Edit Filters to filter our preference.

At this point, we commit our actual preference values to the schedule by clicking **Save**.

They will take effect after the next optimization.

Drivers

Delete this text and replace it with your own content.

Work LImitations

Delete this text and replace it with your own content.

Driver Changeover Vehicle

Delete this text and replace it with your own content.

Depots

Delete this text and replace it with your own content.

Miscellaneous Settings

Delete this text and replace it with your own content.

Chapter 9: Interactive Scheduling

Delete this text and replace it with your own content.

Chapter 10: Roster Datasets

Delete this text and replace it with your own content.

Chapter 11: Input Data Formats

Delete this text and replace it with your own content.

Chapter 12: Creating a Dataset and Schedule

Scope of this Chapter

There are several ways of importing files required to create a Dataset. Schedules may be imported or created using the Optimizer against an existing Dataset.

Importing a Dataset

Delete this text and replace it with your own content.

Importing a Schedule

Delete this text and replace it with your own content.

Creating a Schedule Using the Optimizer

Delete this text and replace it with your own content.

Appendix A: Using Expert Mode

Purpose of Expert Mode

Expert Mode is available for Preferences and Filters. It is primarily intended for the use of Optibus Professional Services and Integrators to -

- **Add urgent custom features with a turn around of hours instead of days or weeks.**
- **Provide rapid fixes to problems in the field**

It can also be used by customers having the necessary programming expertise.

Expert Mode for General Preferences

There is an additional way to export or import a set of preferences: Click the { } expert mode button. Your preferences are presented in source (JSON) format.

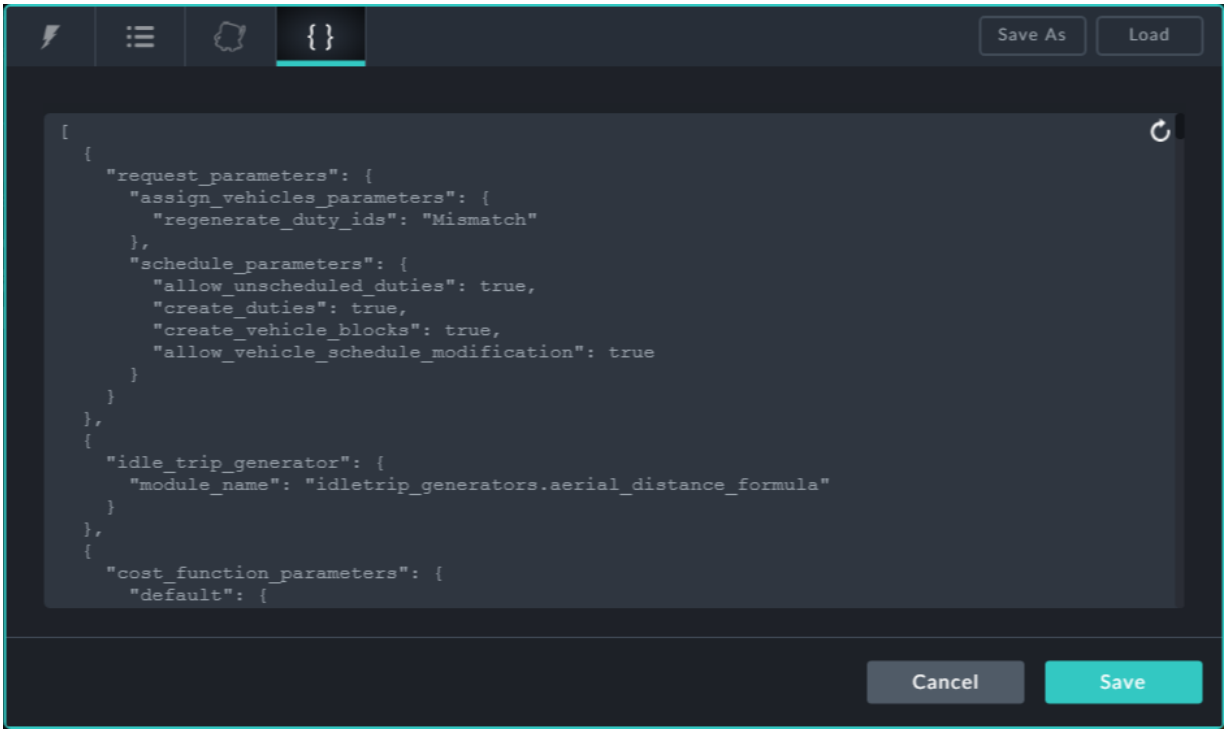


Figure A-1: Expert preferences display

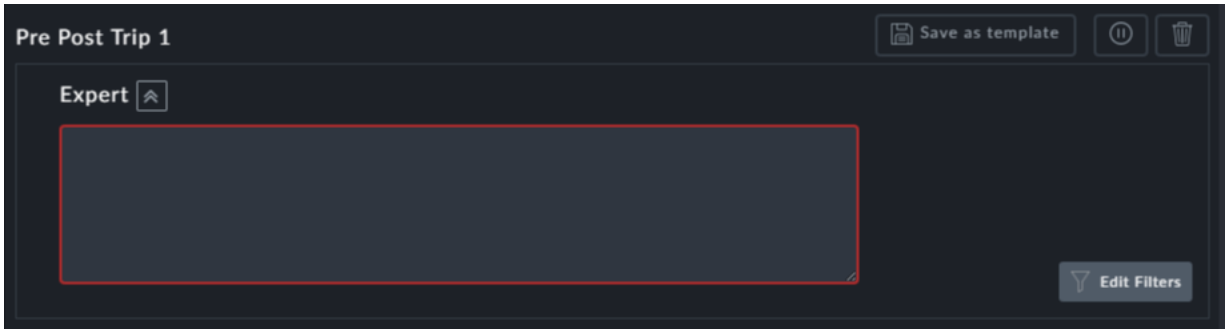
You can make changes in place. If you have not saved them, the top right hand icon will refresh the code to its previous state.

You can also use the system copy/ paste to the clipboard. You may then open an ordinary text editor (such as Notepad), to paste the text and save it.

Expert Mode for *Add Preference*

This expands on the description in **Add Preference**.

The **Expert** toggles open an input area to enter JSON code:

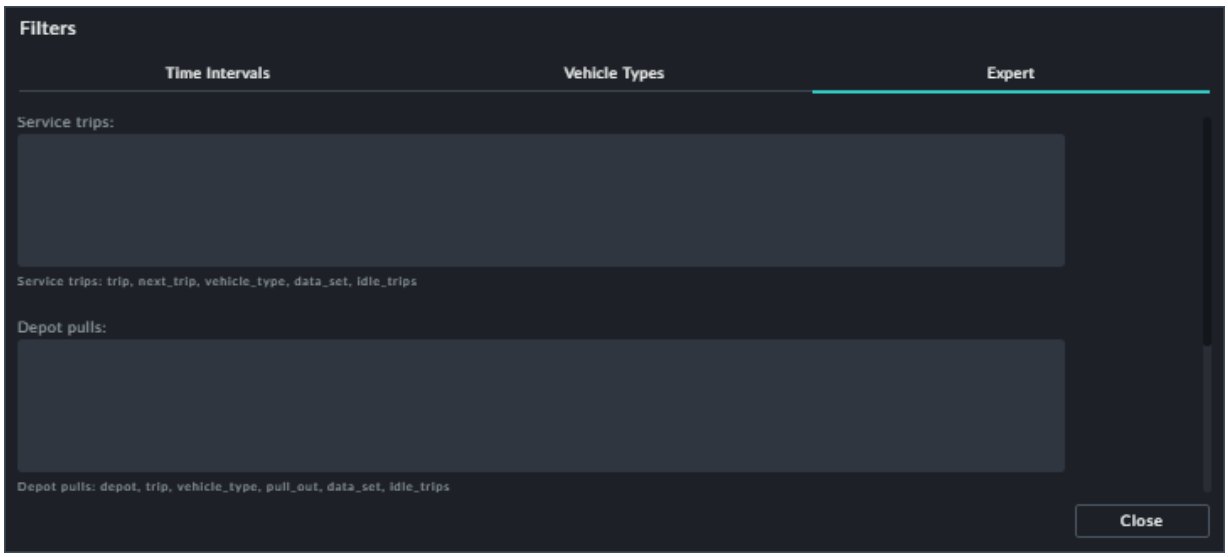


Enter your code. To make room on the screen use the **Expert** toggle again to hide the code window.

Expert Mode for Edit Filters in Add Preference

This expands on the description in **Edit Filters**.

The **Expert** filter is different from the previous Expert cases. It provides three data entry fields:



(You may need to scroll down to see them).

TBD

I don't know how to use them.

Expert Mode for the User Interface for a Topic Preference

This expands the description in **The User Interface for a Topic Preference**.

We will edit the Optibus supplied **Pre\Post trip - General** template, and save it in our local domain.

First, we will use **Expert** mode to make a few small changes to the user intrface. Open Expert mode:

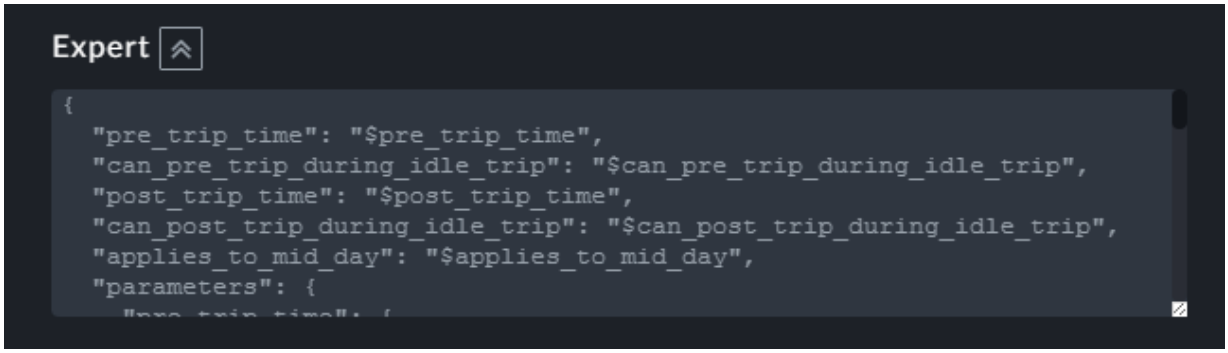
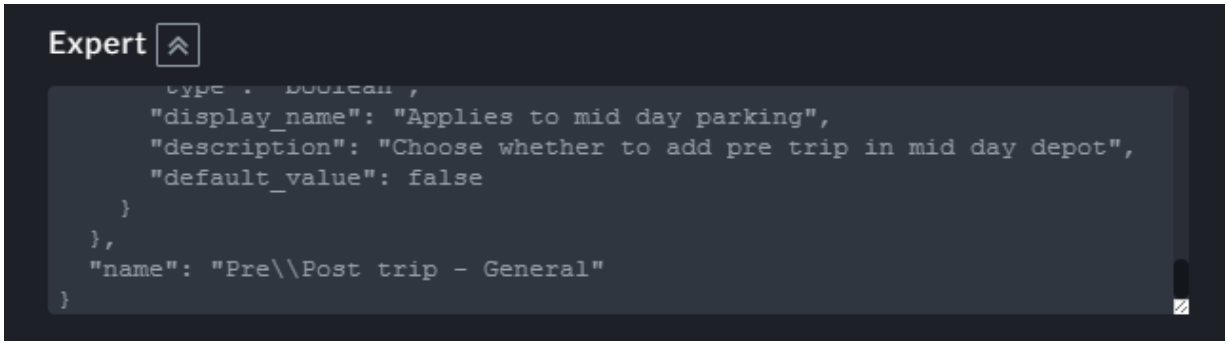
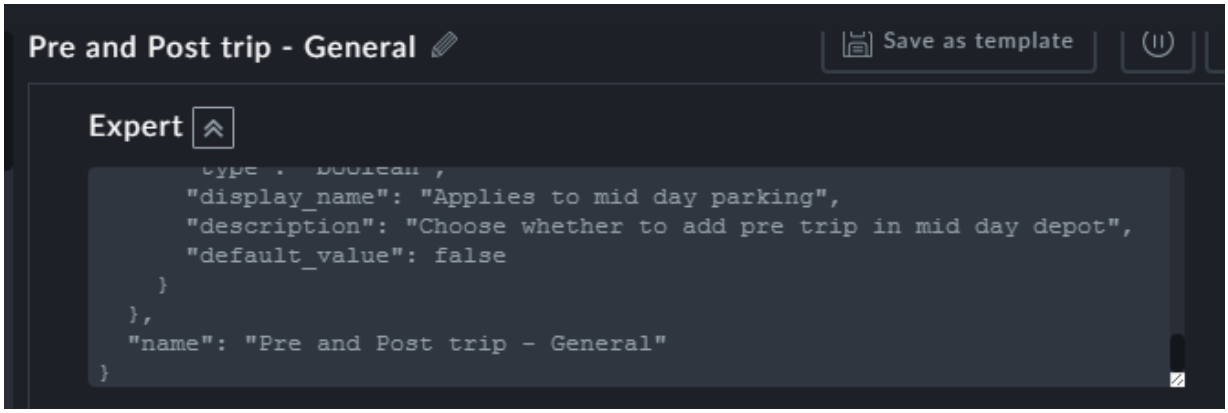


Figure A-2: Expert editing window

Scroll down to the bttom of the text:



The window is a simple text editor. The "name" item is a place-holder for the preference name. Change it to "Pre and Post trip - General". The change is immediate, as you type:

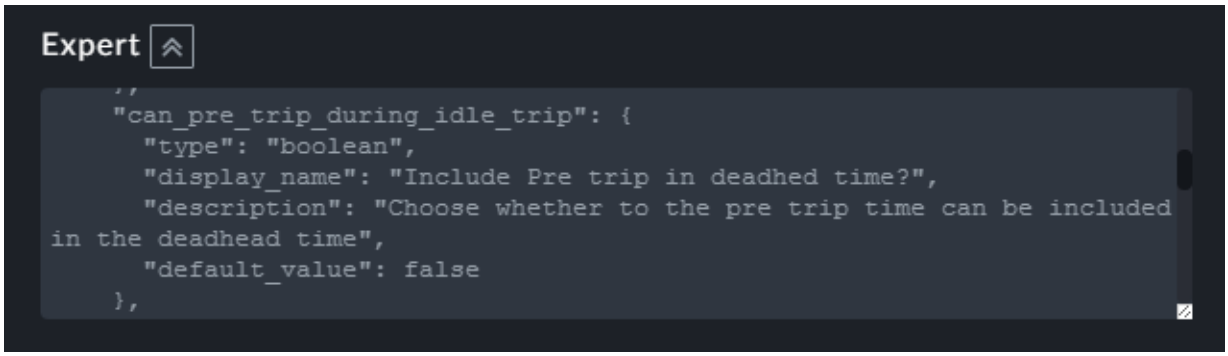


Go back to the top of the editing window (). The text defines the user interface window below it. The structure is very simple:

"String_with_some_description": "$value_name", (repeated as often as necessary)

The "String_with_some_description" is defined in the "parameters" section further down. The "$value_name" comes from a catalog of variable names available for this purpose. You can see them TBD.

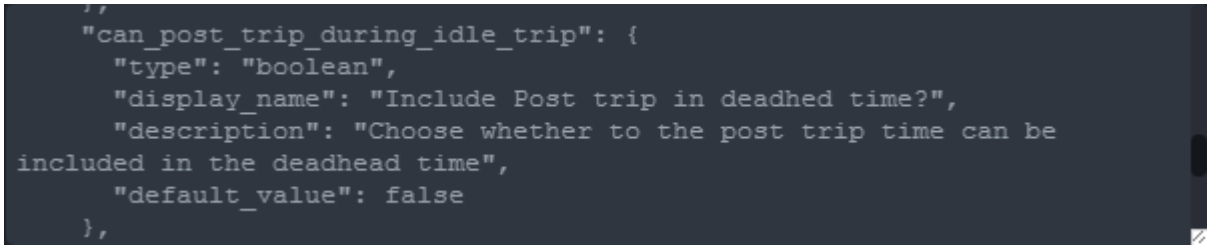
In the "parameters" section, scroll down to the "can_pre_trip_during_idle_trip" item, and look at "display_name". Change the formulation of the question to: "Include Pre trip in deadhed time?"



You could also change the mouse-over tool-tip in the "description" field.

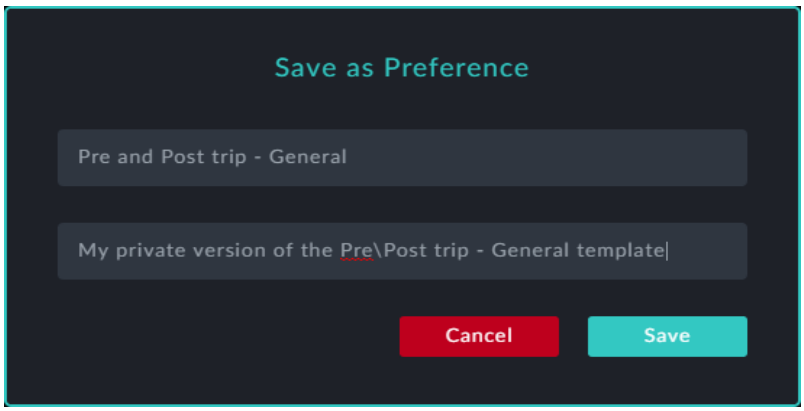
Unlike the preference name change, this one is not concurrent with your typing.

To complete the example, go to "can_post_trip_during_idle_trip" and change the "display_name" to "Include Post trip in deadhed time?"

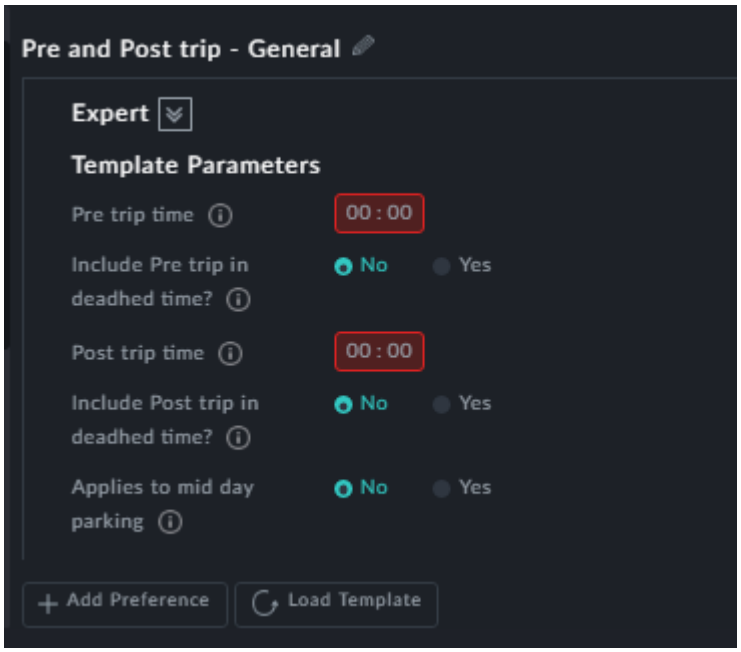


We will commit our changes in two steps:

First, we save this preference as a template so that we can use it again in another schedule. Open **Save as template**:



Close the Expert area and observe that the user interface has been updated with our changes:



Remember that at this point you have created and saved a template. The preference does not become part of your schedule until you enter the required parameters, save and optimize.

Glossary

C

Changeover

Driver changing vehicles between trips.

D

Dataset

Consists of the following catalogs:Trips, Stations, Vehicle Types, Deadheads,

Deadhead

Non-revenue earning trip

Duty

P

Post trip

Pre trip

Pull in

Trip from end point of a Service Trip to a Depot

Pull out

Trip from a Depot to start point of a Service Trip.

R

Revision

Saved schedules are stored with a revision number instead of simply being over-written.

Roster

TBD

S

Schedule

Inherits the parent Dataset catalogs and add Vehicle and Driver Gantts

Split

T

Trip

Movement of a vehicle ...

V

Vehicle

Index

Customer Response

Delete this text and replace it with your own content.

End Page

Delete this text and replace it with your own content.