ResourcePro Module for DirectRoute

v25.3

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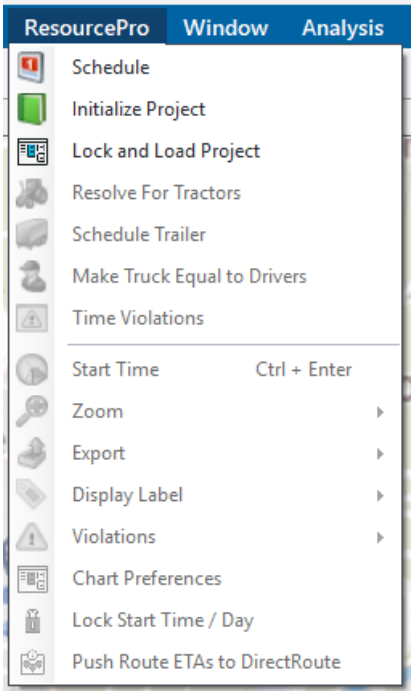
About ResourcePro

ResourcePro is an optional, separately-licensed planning tool for DirectRoute. It optimizes drivers and power units required for weekly route schedules. It will help reduce under-utilized fleet equipment and non-value-added driver hours, minimizing the fleet size needed to operate a dedicated business.

ResourcePro allows you to look at routes in several ways. It's designed to string routes together utilizing rolling Hours of Service (HoS) rules and slip-seating to optimize driver and power unit schedules required for weekly routes.

ResourcePro uses Gantt charts and detailed reports to show information generated by its process, enabling you to see where resources may be optimized by moving a route to another driver, another vehicle, or even another day if allowed by scheduling parameters.

Licensed users can access the ResourcePro menu options directly from the DirectRoute menu:



The ResourcePro menu items are:

- **Schedule**: Launches the ResourcePro build that assigns trucks and drivers to selected routes using the algorithm and set Scheduling parameters.
- **Initialize Project**: Displays the current driver/ truck assignments as uploaded from the .xls file. This is manually scheduled and turns off the algorithm.
- **Lock and Load Project:** Allows users to manually schedule one or more drivers and lock in their schedule, then use the algorithm to optimize the load across the remaining drivers and routes.
- **Resolve For Tractors**: Resolves for tractors only, without changing any of the route start times, unless manually overridden. This function is used after routes have been manually reassigned and start times changed.
- **Schedule Trailer**: Recalculates the solution, scheduling trailers independent from drivers and/or tractors, with requested minimum hours between routes.

- **Make Trucks Equal to Drivers**: Recalculates the solution, making the number of Trucks used equal to the number of drivers used. The new solution is written to a file named Temp.res saved in the current data folder.

NOTE: ***Make Trucks Equal to Drivers*** is utilized on a solution that has already been computed.

- **Time Violations**: Selecting Time Violations will turn the display to green. Any time violations in the routes will appear as red (wait time, return time, time window).
- **Start Time**: Change the Start Time on a route.
- **Zoom**: Zoom in or out of the Truck or Driver Gantt Charts.
- **Export**: Exports driver and truck statistics to a spreadsheet file (Driverstats.xls, Truckstats.xls); saved in the data folder.
- **Display Label**: Allows users to choose which labels are displayed on the Gantt charts; options include Truck Number, Start Time, Truck ID, Route Number, or None.
- **Violations:** If truck or driver violations occur when manually reassigning resources, you can ignore specific violations rather than correct them.
- **Chart Preferences:** Sets options for the ResourcePro chart such as working days and start/end times.
- **Lock Start Time / Day**: Locks the start/end time based on the currently selected route.

Create a New ResourcePro Schedule Solution

Once Route Files have been created and initialized in DirectRoute, they can be used to build the ResourcePro schedule solution.

It is important to first review the Truck File *MinLayover/Max Layover* columns and *MaxDriveTm* and edit the hours to reflect the recommended settings for single drivers and/or driver teams. This will ensure necessary layovers are scheduled to provide drivers with required rest periods before taking more routes.

Single Drivers: *MinLayover* = 10, *MaxLayover* = 18

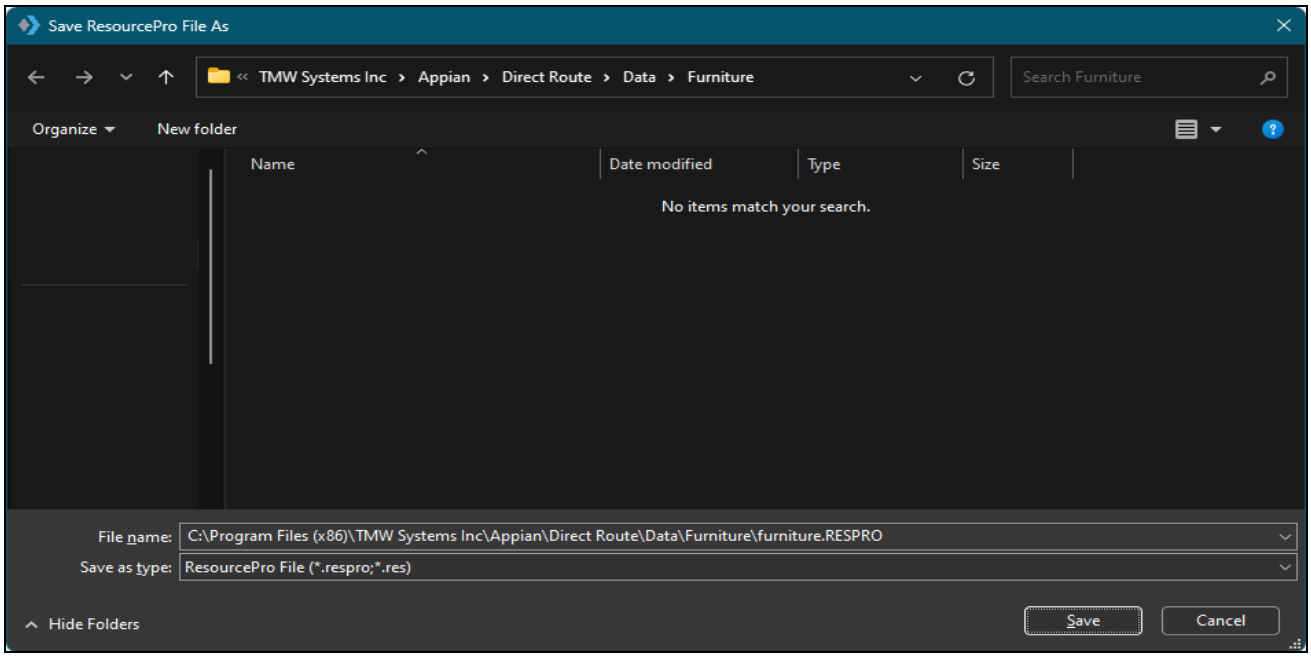
Driver teams: *MinLayover* = 0, *MaxLayover* = 0, *MaxWorkTm* = 24, *MaxDriveTm* = 24

Be sure to select Save before closing the Truck File if updates were made.

Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
EarStart	EDate	LatStart	LatFinish	LDate	MaxWorkTm	TargetWrkTm	MaxDriveTm	MinLayover	MaxLayover
0	1		2400	7	14		11	10	18
0	1		2400	7	14		11	10	18
0	1		2400	7	14		11	10	18
0	1		2400	7	14		11	10	18
0	1		2400	7	14		11	10	18
0	1		2400	7	14		11	10	18

To create the ResourcePro schedule solution, select **ResourcePro > Schedule** from the menu**.**

1. Locate and select the Route File that was created and initialized in DirectRoute.
2. Click **Open**.
3. ResourcePro will now rename the Route File with a .respro extension.



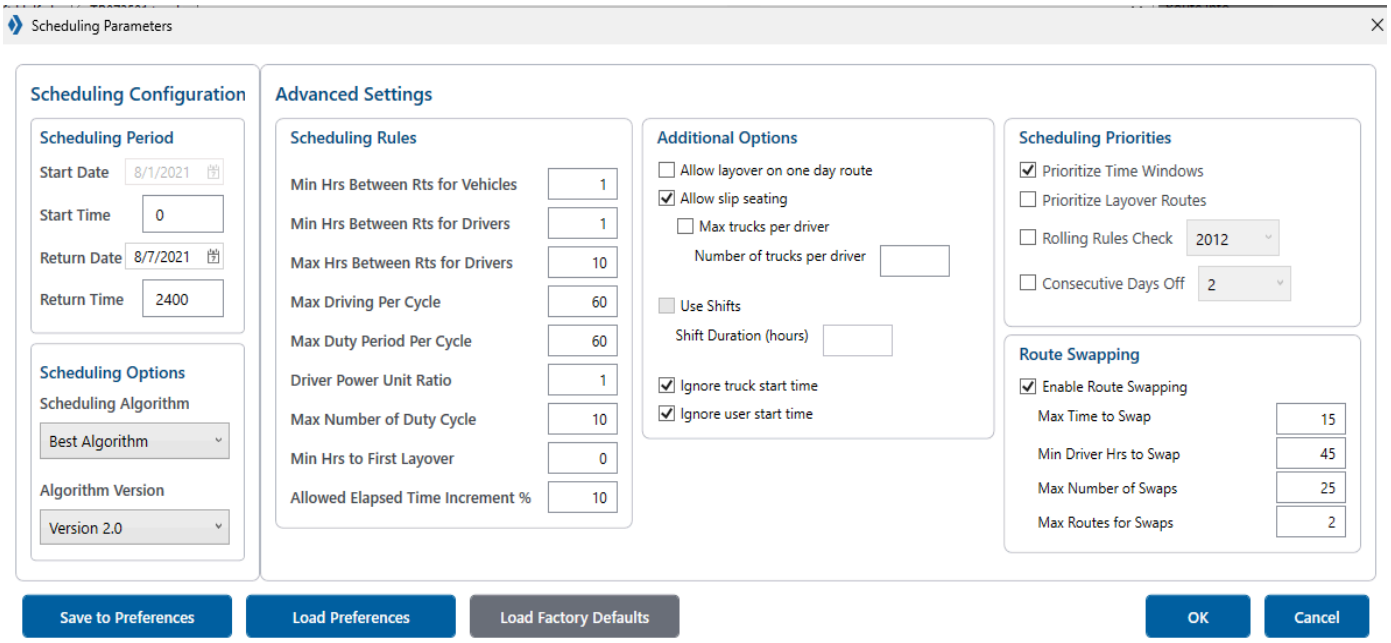
4. Click **Save**
5. Once the .respro file extension has been assigned and the file has been saved, the ***Scheduling Parameters*** dialog box will open.

Scheduling Parameters

Users can set scheduling preferences to override the factory default settings to make project creation easier each time.

Adjust the settings for a single use, save the adjustments to Preferences, or toggle between your preferences and the Factory Defaults.

- **Scheduling Configuration:** Set the parameters for the scheduled period.
- **Advanced Settings:** Define what can happen to the drivers during that period of time.
    - Users can also set these parameters in DirectRoute: File> Preferences> ResourcePro> Scheduling Parameters.
    - Changes made in DirectRoute are reflected in ResourcePro and vice versa.



Scheduling Rules

Min Hours Between Routes for Vehicles: This value is set to the minimum hours that are to be allowed between routes for a vehicle. It can be a decimal, as in .5, if only a half-hour is to be allowed. It can also be set to zero if no break is needed between the routes.

Min Hours Between Routes for Drivers: This value is much like the previous option but is designed to set the minimum hours between routes for the driver.

Max Hours Between Routes for Drivers: This value will set the maximum hours between routes for drivers. If a route assigned to the driver exceeds this amount, the route will be assigned to another driver.

Max Driving Per Cycle: This value will assign the maximum number of hours that a driver may drive in the scheduling period. The number should be set to the maximum driving time allowed for the driver(s). Default is 60 based on current DOT rules.

Max Duty Period Per Cycle: This value will assign the maximum number of hours that a Driver may work in the scheduling period. The number should be set to the maximum duty time allowed for the driver(s). The default is 60 based on current DOT rules.

Driver Power Unit Ratio: Driver Power Unit Ratio is used when ***Best Algorithm*** is selected in the algorithm. The parameter attempts a solution with Drivers First, then Vehicles (Power Units), and then a solution with a combination of drivers and vehicles together. It then selects the best solution.

Max Number of Duty Cycles: This option allows you to specify the maximum number of duty cycles for the scheduling period.

Min Hours to First Layover: This option allows you to specify the minimum number of work hours before the driver takes his first layover. Used to control the scenario where the route is dispatched immediately after another route and the driver is only on the clock for a couple of hours before he must take a layover.

Allowed Elapsed Time Increment: Max increase in overall elapsed time, from the minimum, that can be scheduled. This prevents ResourcePro from extending a route with one layover into 2 layovers or incurring a significant amount of wait time.

Consecutive Days off: *Consecutive Days Off* used in conjunction with *Max Number of Duty Cycles* allows the scheduler to ensure 2 or 3 days of consecutive off-duty time during the *Scheduling Period* (e.g., 2 consecutive days off during a 7 or 8 day cycle). *Consecutive Days Off* are measured in hours - 48 hrs or 72 hrs.

Scheduling Options

Scheduling Algorithm: This option defaults to ***Best***, but may be changed to either ***Drivers First*** or ***Tractors First***.

- ***Best:*** This option will run ***Tractors First****,* followed by ***Drivers First***, then a combination of both. Select the best result using the ***Driver Power Unit Ration****.*
- ***Drivers First****:* Attempts to reduce the number of Drivers required. Because it assigns the drivers and then the power units, it should not be used if slip seating opportunities are desired.
- ***Tractors First****:* If limiting tractors is a priority, this will attempt to limit the number of power units used. This is a good option if you want to see how much time windows are constraining the solution.

Algorithm Version: Vers 2.0 should be used for all routing solutions.

Allow Layover on One-Day Route: This option will allow or deny layovers on one-day routes; unchecked by default.

Allow Slip Seating: This option will allow or deny slip seating of power units. When checked (default), power units will be more fully utilized.

Max Trucks/Driver, No of Trucks/Driver: The algorithm attempts to find driver schedules that are most compatible for sharing the same Truck; if Max Trucks/Driver is selected, input the number of trucks that can be assigned to any one driver in the No of Trucks/Driver box.

Use Shifts/Shift Duration (hours): This option attempts to schedule the drivers within the same shift for the entire week; using this option can cause an increase in number of drivers used. Route Swapping must be unchecked to use this option.

Ignore Truck Start Time: Ignores the Start Time displayed in the Truck File (LStart), allowing for optimal solution results.

Ignore User Start Time: Ignores manually set (by user) start times. If not selected, manually set start times can be altered after generating a solution.

Scheduling Intervals

Start Date: Not editable; default is the Dispatch Date.

Start Time: The Start Time for the scenario; default is 0.

Return Date: The date that the routing solution should end, with the last route being completed. Defaults to 7 days out from the Start Date.

Return Time: Default is midnight (2400).

Scheduling Priorities

Prioritize Time Windows: Checked by default. When using Version 2.0, ResourcePro will automatically comply with this rule, so no action to check/uncheck is necessary. If using Algorithm Version 1.0, use when:

- *Earliest/Latest Date* or edited time windows are used to restrict (by time or date) when deliveries may be made; will schedule the restricted routes first before scheduling routes that have no restrictions on delivery time/date.
- When this option is not used (*Version 1.0*) and restricted routes are present, ResourcePro may generate a solution that creates trucks with many routes and other trucks with only the restricted routes.

Prioritize Layover Routes: This option attempts to group layover routes to minimize the total number of Drivers that require a sleeper. Checking this will force the algorithm to prioritize layover routes, thus assigning them first before assigning one-day routes.

Rolling Rules Check: When not checked, will schedule a set of routes for each driver, up to 60/70 hours on duty in 7/8 consecutive days, then restart a 7/8 consecutive day period after taking the layover scheduled by DirectRoute (based on *Min/MaxLayover* in the Truck File).

- ***The Rolling Rules Check (2012)***: When checked, will schedule a set of routes for each Driver, up to 60/70 hours on duty in 7/8 consecutive days, then restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.
- ***The Rolling Rules Check (2013):*** When checked, will schedule a set of routes for each Driver, up to 60/70 hours on duty in 7/8 consecutive days, then restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty. Routes will include two periods from 1 a.m. to 5 a.m. home terminal time, once per week/168 hours, measured from the beginning of the previous restart.

Swap Options

Route Swapping: Attempts swapping routes like Between Route Optimization in DirectRoute. The objective is to take a second pass at reducing the number of Drivers. ***Use Shifts*** must be unchecked to use this option.

Max Time to Swap: Defaults to 15.

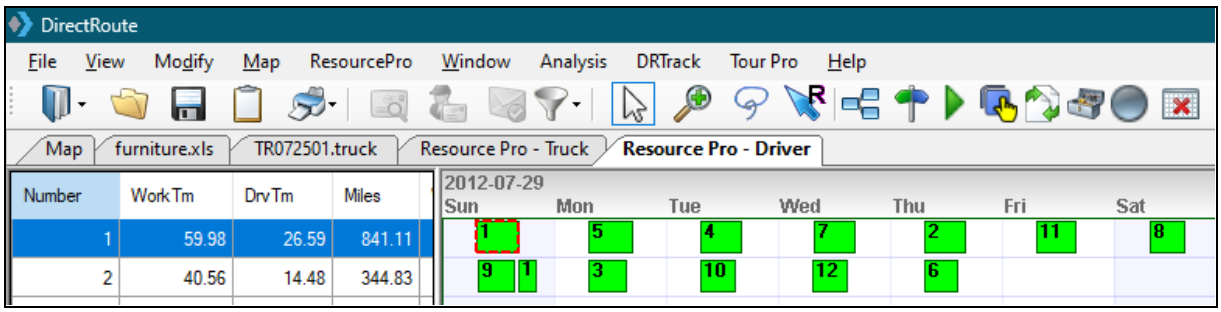
Min Driver Hrs to Swap: If a driver has hours equal to or greater than the number entered, ResourcePro will not look to swap any of these routes. The value defaults to 45 but may be raised or lowered; a lower number will result in fewer drivers being candidates for swapping.

Max Number of Swaps: The maximum number of swaps that can be made during the calculation of the solution. The default is 25 but can be raised or lowered.

Max Number of Routes for Swaps: This entry will prevent adding routes to the least utilized resources.

Once you have selected the appropriate Scheduling Parameters, ResourcePro will launch into the routing solution. The Solution Files will open once the process has been completed.

The Solution Files consist of the Route File, Truck File, Stop File, Driver Gantt Chart, and Truck Gantt Chart. To view each file, click its respective tab at the top of the screen.



Gantt Charts

ResourcePro provides detailed Gantt Charts and spreadsheet reports by Truck and Driver Files across the week. The Gantt Charts are the main components of a solution; they display graphic events and statistics for each route and driver in two separate charts. Either chart can be saved to a file or printed.

The Truck Gantt Chart shows the number of trucks used in the routing solution.

- The left side panel displays the Truck ID numbers, as well as the work time, drive time, miles, and volume of each truck.
- The center panel consists of the actual chart, indicating each truck and the corresponding route assignment.

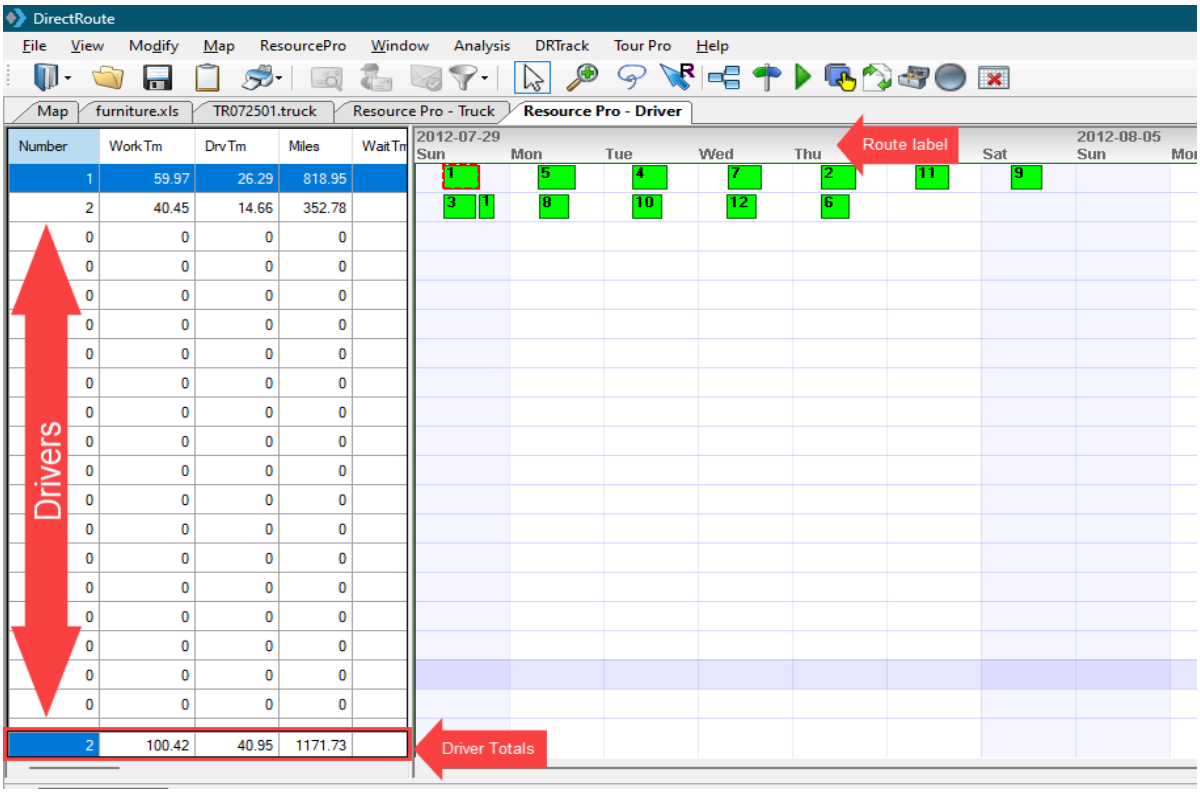
The Driver Gantt Chart shows the number of drivers used in the routing solution

- The left side panel displays the driver ID numbers, as well as the work time, drive time, miles, and volume of each Driver.
- The center side panel consists of the actual chart, indicating each driver and the corresponding route assignment.

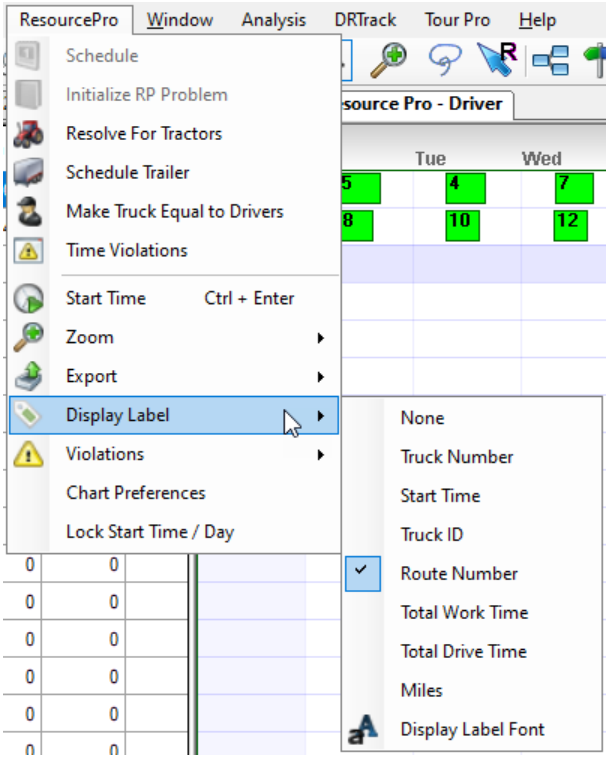
Colors displayed on the charts are chosen from the Truck File color field. By default, the route's color is set to Lime.

The labels displayed on the Gantt Charts can be customized (changed) to indicate Route #, Truck ID, Truck #, Start Time (Route), Hours, Miles, or Drive Time.

EXAMPLE: The label used in this Truck Gantt Chart is the Route#.

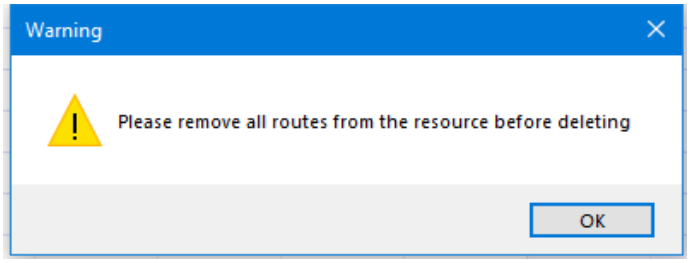


To change route labels, click **ResourcePro > Display Label** from the menu.



You can change the font size by clicking **Display Label Font** from the ***Label Display*** menu.

Similar to your favorite spreadsheet application, you can add/remove rows directly from the Gantt Chart by right-clicking on a cell and selecting **Insert Above**, **Insert Below**, or **Delete** rows. If you attempt to delete a row (Route or Truck) with routes assigned to it, you will receive a message that indicates that all routes must first be removed before the record can be deleted.

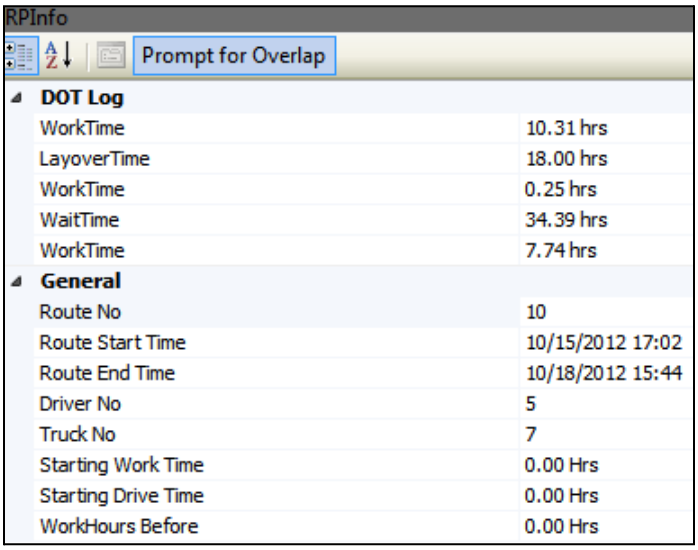


Info Display Box

To the right of the Gantt Charts are additional info boxes; Stop Info, Truck Info, Route, Solution, and ResourcePro.

The Stop, Truck, Route, and Solution info boxes are identical to the info boxes provided in DirectRoute and can be viewed and used in the same way. The ResourcePro info box provides route-specific DOT log data.

Select any route number in the Gantt Charts, or any truck or driver number in the Truck/Driver File, to populate and view the corresponding data in the Info box.

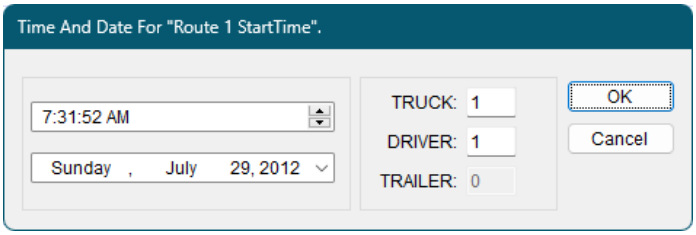


Reassign Resources

As you fine-tune your routes and resources, it may be necessary to reassign trucks and/or drivers from one route to another.

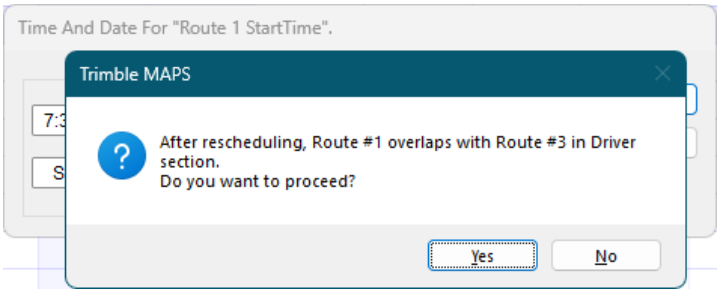
On the left panel of either the Truck or Driver Gantt Chart, select the truck or driver number to reassign, or select the corresponding route number in the Gantt Chart to highlight the route.

Ctrl+Enter will open the Route Reassignment dialog:



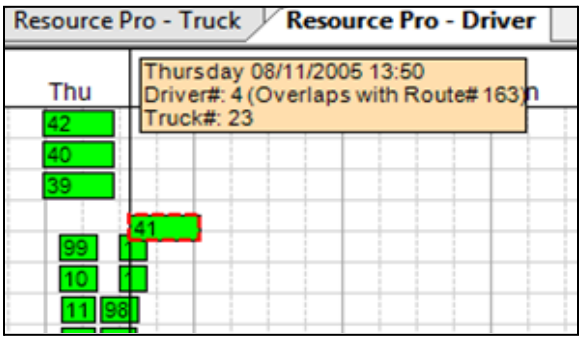
Change the Truck or Driver number to the new number for this route.

If the reassignment will cause an overlap of resources, a warning box will appear.



Dragging Routes

You can drag routes up around the Gantt chart to reassign them to a different truck or driver. While dragging, a detail box will appear, updating as you drag the box around:

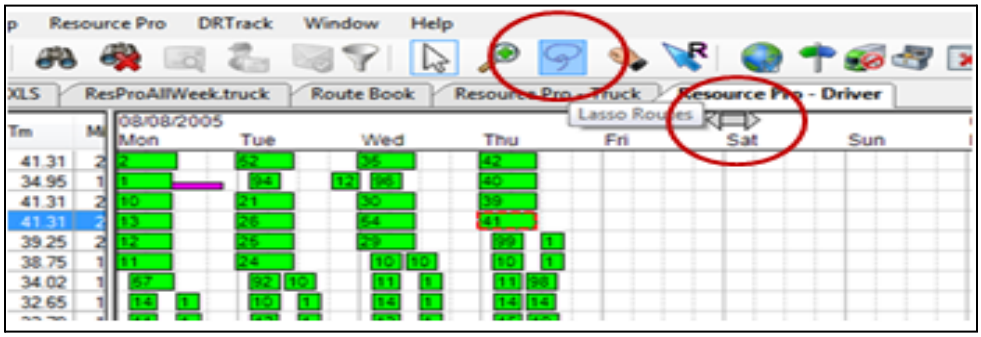


If the move causes an overlap of resources, a warning will show (Overlap Warning Dialog Box)**.** To ensure the route start time does not adjust during the reassignment of the resource, lock the Start Time/Day by holding Ctrl while dragging.

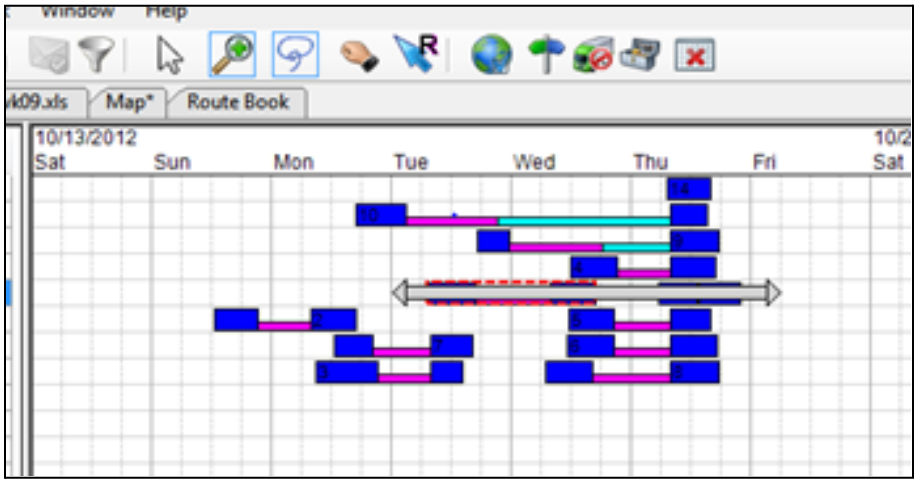
Lasso Routes

The Lasso can be used to move several routes at one time. Before beginning the lasso function, ensure there are no violations on any of the routes.

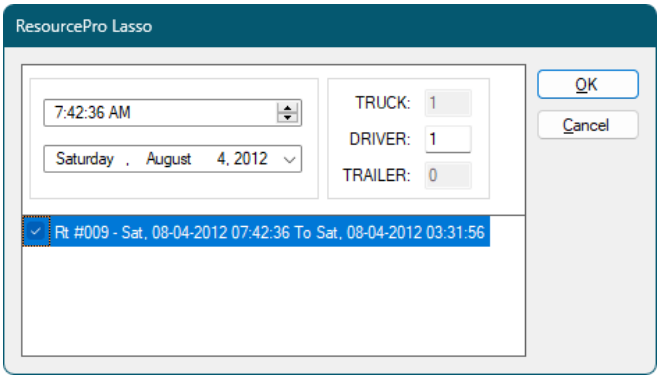
From the Truck or Drive Gantt chart, click the **Lasso** tool on the toolbar:



While active, the Lasso tool changes the cursor to a double-ended arrow. Click the first route to be moved, then click the last route to be moved. The chart will update with arrows to indicate this change of order:



The ***Lasso*** window will appear with the selected routes listed and checked.



The ***Start Time/Day*** for the first checked route populates automatically.

To deselect any routes, uncheck the box in front of the route.

Type in the new truck and driver# for the highlighted route in the info box.

Repeat for the next route, and so on.

Once all your changes have been made, click **OK**.

TIP: The first route listed is the basis for the time stamp.

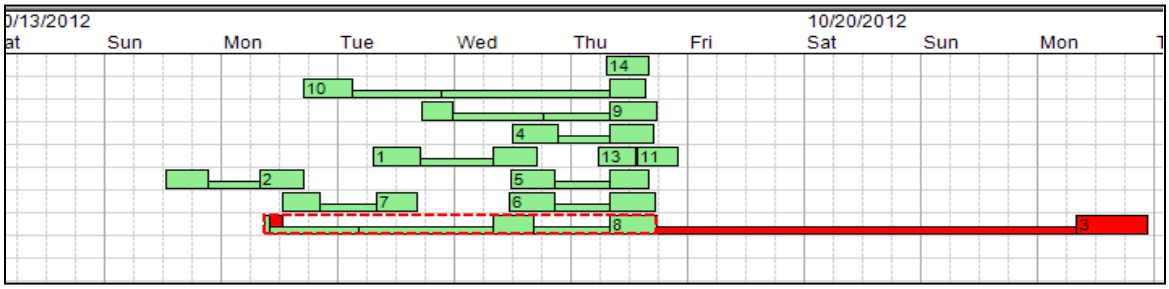
Reviewing and Resolving Violations

If violations do occur when scheduling routes with ResourcePro, they should be identified and resolved before proceeding.

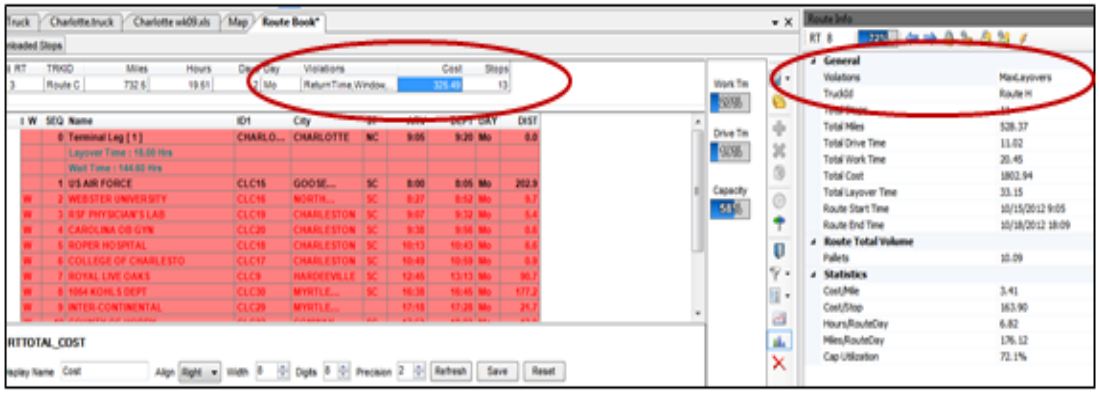
While viewing the Truck or Driver Gantt Chart, click **ResourcePro > Time Violations** from the menu. The routes on the Gantt chart will change color and indicate where the violations exist.

Green = No violations.

Red = Violations.



Violations can also be viewed in the Route Info box or the Route Book.



Violations can be resolved either by dragging or by changing the Start Time/Day.

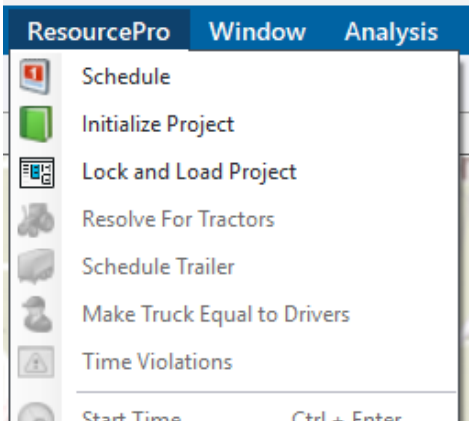
Often, moving the Start Time as little as one second is enough to remove the violation from the route, but other factors may have to be considered.

Each time the Start Time is changed, the Gantt Chart display will alter. If violations are still selected in the View menu, changes may be watched to check for correction of the violation. When the violation is corrected, ensure that it has not violated other parameters set for that route, such as layover, wait time, etc.

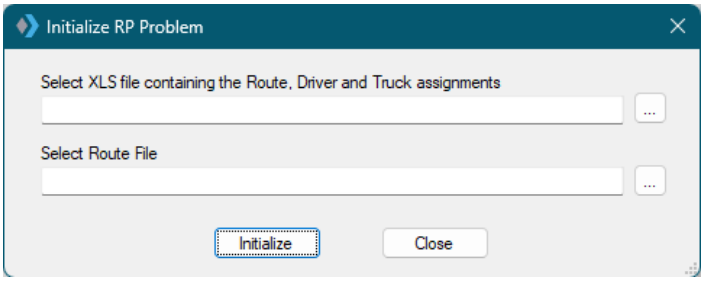
Initialize Project

ResourcePro provides a tool to display current driver/ truck assignments. Using this tool, you can simulate the way the fleet is currently running; however it turns off the scheduling algorithm.

1. Create a spreadsheet file containing **each available driver and route** using data from the current Route File.
   a. Open a new spreadsheet.
   b. Create four columns and label them as Route, Truck, Driver, and StartDate.
   c. Copy the same data from the Route File and paste it into the spreadsheet.
   d. Save the file in your data folder (save it as a .xls file).
2. From the ResourcePro menu, click on *File* then select *Initialize Project*.



3. Upload the .xls file created in step 1.
4. Select the Route File containing the original data.
5. Click **Initialize**.



10. View the current Route, Driver, and Truck utilization information in the Gantt Chart.

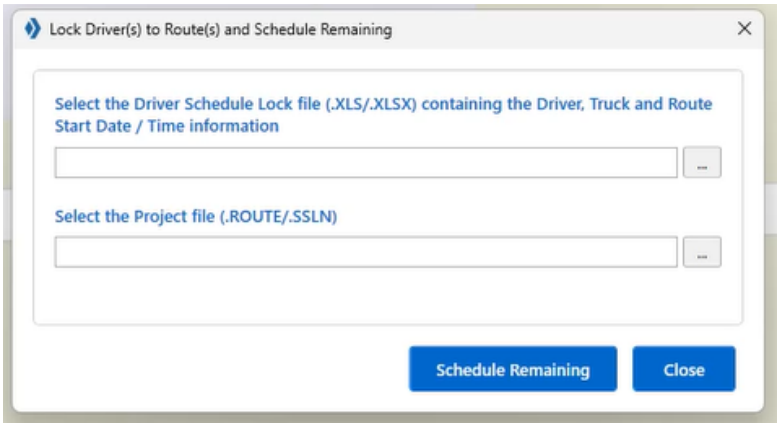
Lock and Load Project

The Lock and Load Feature allows users to manually schedule one or more drivers and lock in their schedule, then use the algorithm to optimize the load across the remaining drivers and routes.

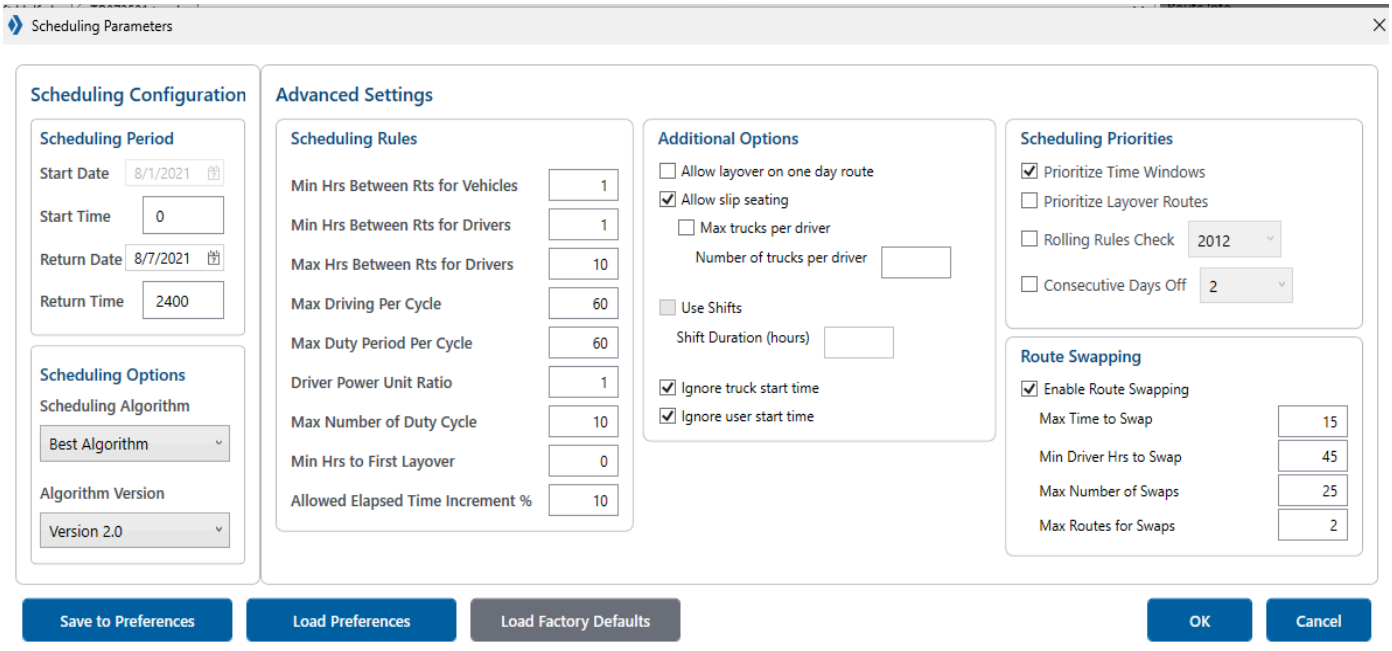
1. Create a Driver Schedule Lock file.

- Enter the Route, Truck, Driver, and Dispatch date/ time you wish to lock in (prevent changes from the algorithm).
- Multiple drivers can be locked.

2. Click on *File* and select *Lock and Load Project.*
3. Upload the Driver Schedule Lock file created in step 1.
4. Upload the corresponding Project file.



5. Click on *Schedule Remaining* to invoke the algorithm to schedule the rest of the available drivers.
6. Click on Load Preferences to use the selected parameters, and make changes as necessary.
   - Toggle to *Load Factory Defaults* to clear custom parameters.

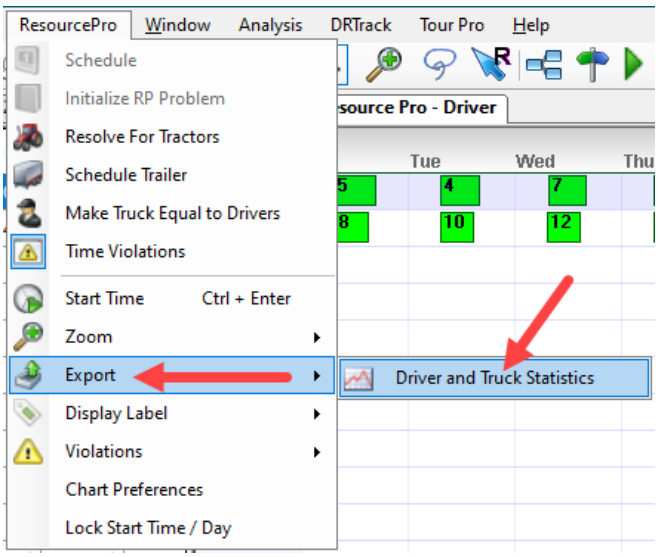


7. View the schedule in the Route Book.

Export ResourcePro Statistics

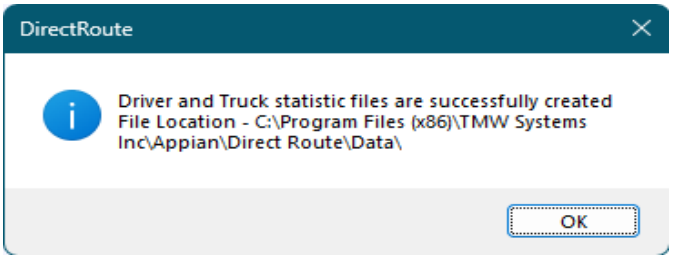
Statistics from the Truck and Driver Files can be exported into a spreadsheet. These statistics include total work hours, drive hours, stops, miles, dates, and times for each driver and truck.

To export the statistics, select **ResourcePro > Export > Driver and Truck Statistics** from the menu.



Two files are created upon export: Truckstats.xls and Driverstats.xls.

When the export has been completed, a dialog box will appear to advise where the files can be located. Both files can be edited, saved, and/or used outside of ResourcePro.



Push Dispatch Times to DirectRoute

DirectRoute creates optimal routes based on cost without considering dispatch times as a whole, unless limited.

For example: DirectRoute's optimization algorithm sees dispatching 25 drivers on Monday and zero the remainder of the week the same as dispatching an even number of drivers per day, Monday through Friday.

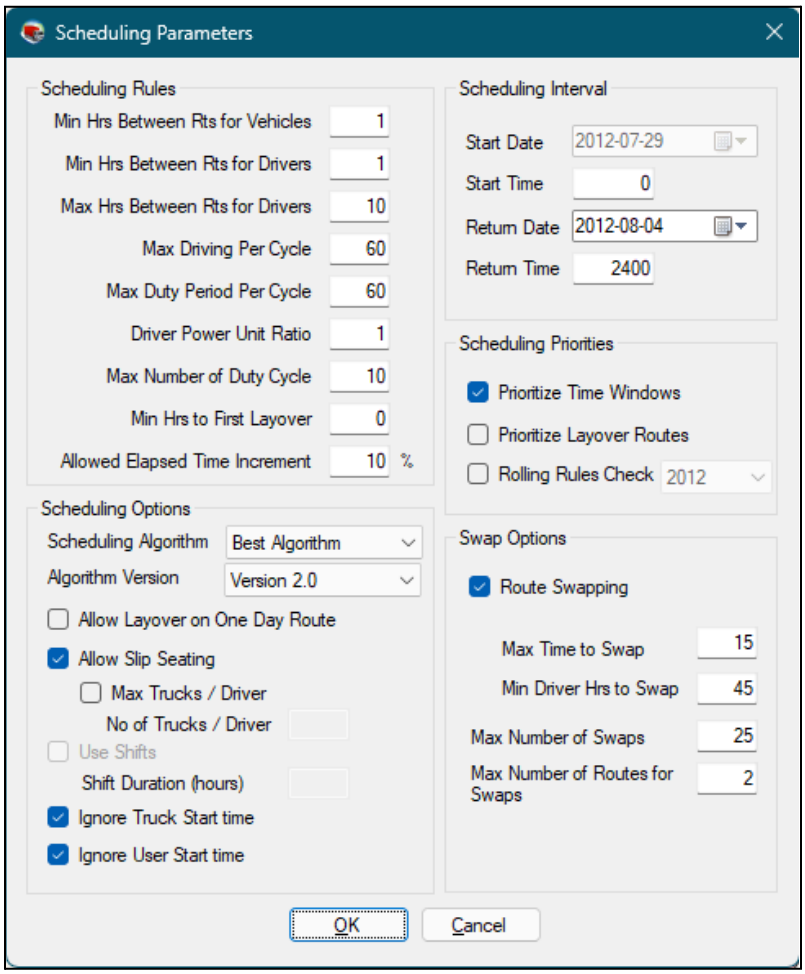
ResourcePro helps find the optimal number of drivers and tractors needed, with the goal of an even number of assets used per day across a week or longer timeframe.

This feature, available in DirectRoute version 25.2 and newer, allows users to:

- View the optimized result created by ResourcePro — share the stop, truck, distance (if used), DRProject.config files, and updated .ROUTE file.
- Push Route ETAs to DirectRoute i.e., update the .ROUTE file with the new dispatch times and / or days which were created by ResourcePro.
- Share .ROUTE files with other users who may not be licensed for the entire ResourcePro application.
    - Requires a ResourcePro license for at least one user in your organization

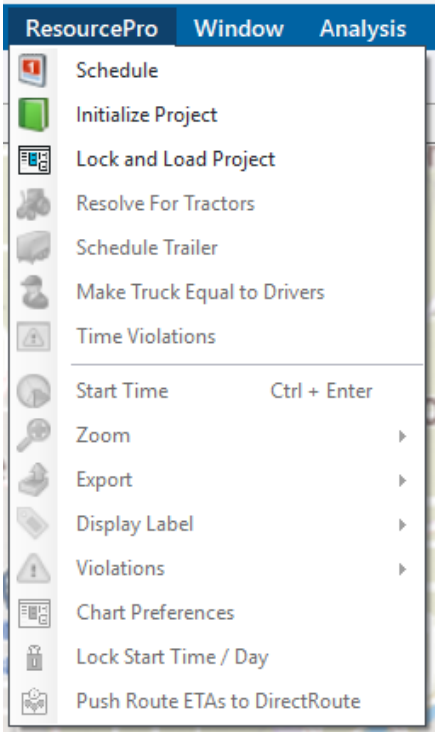
To use this feature, complete the following:

1. Create and solve a project in Direct Route to prepare the .ROUTE file for scheduling (See Direct Route User guide for instructions.)
2. Create a .RESPRO file in ResourcePro.
    a. Click on ResourcePro in the DirectRoute header toolbar, and select *Schedule*.
    b. Save the .ROUTE file and set the name of the .RESPRO project, when prompted.
    c. Enter Scheduling Parameters you want the algorithm to consider when creating the solution.



    d. Click on *OK* to create the project.
    e. Make necessary changes manually.
    f. Save the .RESPRO file.

3. Merge all newly established Route Start Times and / or Dispatch Days from ResourcePro to the previously created .ROUTE project in DirectRoute:
   a. Click on ResourcePro and select *Push Route ETAs to DirectRoute.*



   b. Click on *Yes* in the confirmation window to merge the .RESPRO file into the .Route file.
      - The original .ROUTE file should now be updated.
   c. Close the current project in ResourcePro.
   d. Click on *File* then *Open* to view the .ROUTE project that was just updated.
      - The Start Times and Dispatch Days in the Route Book match the solution created in ResourcePro.
      - Driver, Tractor and Trailer numeric identifiers are not passed from ResourcePro back to DirectRoute, only the start times and days.