Routing Visualization

for

FIELD SERVICE CLOUD

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1 Document Purpose and Scope

This document is intended as a description and user manual of Routing Visualization – a new feature of Oracle Field Service Cloud to be used by managers and dispatchers engaged in handling the incoming workload and assigning activities to resources. It is assumed that the reader is familiar with the Oracle Field Service Cloud (former ETAdirect) functionalities and operating principles.

2 Glossary

The glossary below contains the basic Oracle Field Service Cloud terms used in this document.

Term	Explanation
Activity	Entity of the Oracle Field Service Cloud system that represents any time-consuming activity of the resource
Bucket	Entity appearing on the resource tree which can contain resources of a defined type and be assigned activities
Company	1) Legal entity, using Oracle Field Service Cloud 2) Entity that represents a Client in Oracle Field Service Cloud; company is created by TOA Technologies during the process of implementation
Group	Resource of the resource tree which represents a group of resources and cannot execute activities
GUI	Graphical User Interface, allowing people to use software by manipulating images rather than by issuing text commands
Inventory	Equipment that can be installed or deinstalled during an activity
Resource	Element in the resource tree representing a defined company asset
Resource Tree	Hierarchy of company resources, showing “parent-child” relationships
Route	List of activities assigned to a resource for a specific date, or a list of non-scheduled activities assigned to a resource
Routing	Process of assigning activities to resources (usually automated)
User	1) Person using Oracle Field Service Cloud 2) Entity used for authentication and authorization, allowing people or external software to access Oracle Field Service Cloud
Work Skill	1) Activity that a resource is qualified to perform (resource property) 2) Qualification required to perform an activity (activity property)

3 Introduction

Routing is a powerful Oracle Field Service Cloud functionality used to automatically assign activities to resources according to their availability, location, work skills and work performance costs. Routing is aimed at creating the most optimal routes in terms of reducing resources' overtime and travel, effective use of the available inventory, and even prioritizing certain activities.

Routing operates according to the so-called Routing Plans which determine the schedule, activity assignment conditions, resource selection criteria and the costs of activity assignment or non-assignment in terms of resources' overtime, travel, and activities priority. Such Routing Plans are then

run automatically or manually and can be manually interrupted. Results of completed Routing Plans are recorded in the 'Routing execution log' showing the number of activities assigned during the Routing run, the number of resources to which activities were assigned, the number of activities not assigned in the Routing run and the reasons of such non-assignment.

Now, in addition to the existing 'Routing' screen in Oracle Field Service Cloud GUI where Routing Plans can be managed and monitored, there is a totally new 'Smart Routing' screen giving a more graphic, visual, and transparent display of what is actually happening "in the black box" of the Routing module. Looking at the 'Smart Routing' screen, the user can see the summary of the Routing Plans assigned to the selected bucket, the autorouting efficiency ratio, the resource utilization ratio and the actual savings achieved as the result of Routing. Naturally, the information included in the 'Routing execution log' is also presented on the 'Smart Routing' screen.

4 'Smart Routing' Screen Overview

The 'Smart Routing' screen is accessible by selecting the 'Smart Routing' option from the Main Menu.

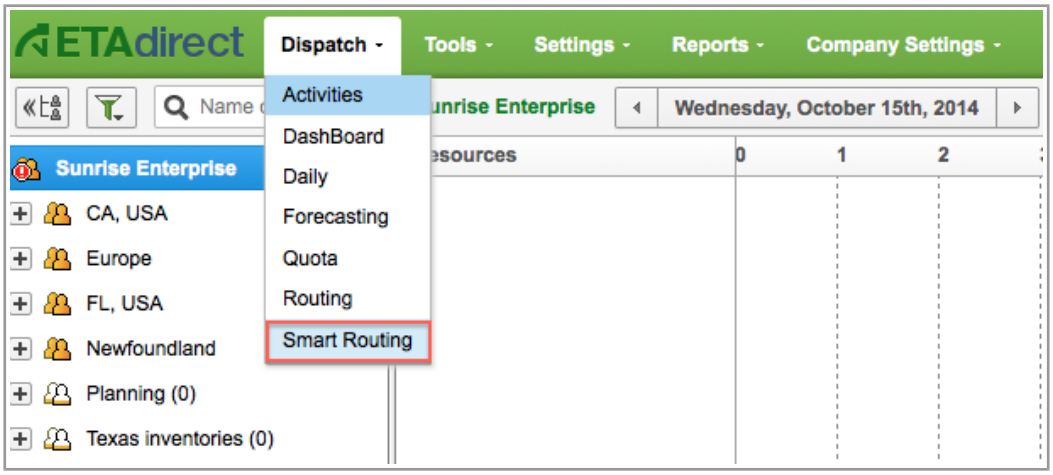


Figure 1: 'Smart Routing' selection

Access to Smart Routing is controlled by a special permission ('Permissions' → 'Manage' → 'Smart Routing').

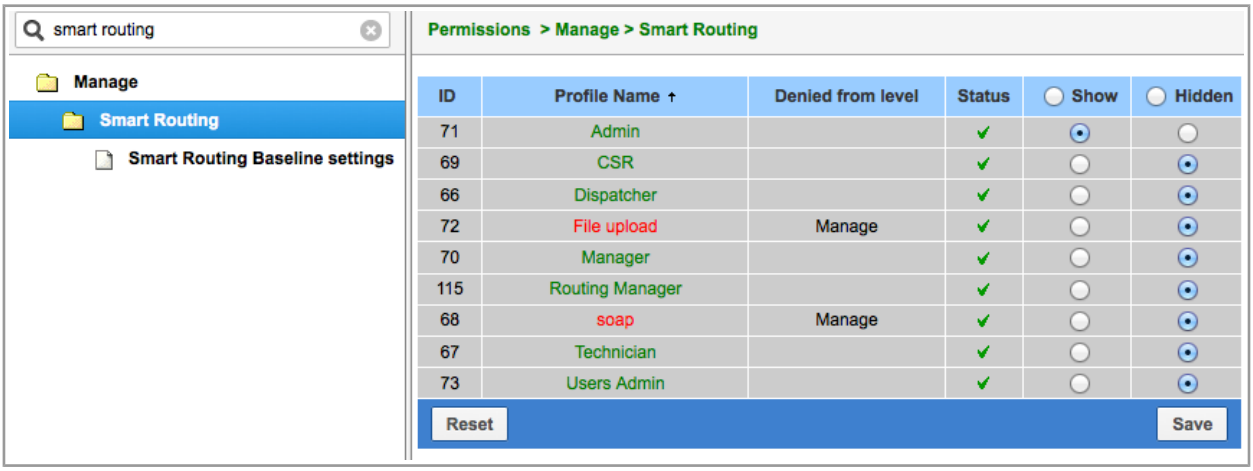


Figure 2: 'Smart Routing' permission

When the 'Smart Routing' permission is enabled, the 'Smart Routing' menu item is available, otherwise it is hidden.

The 'Smart Routing' screen consists of the Resource Tree, the Summary Bar and the Routing execution log.

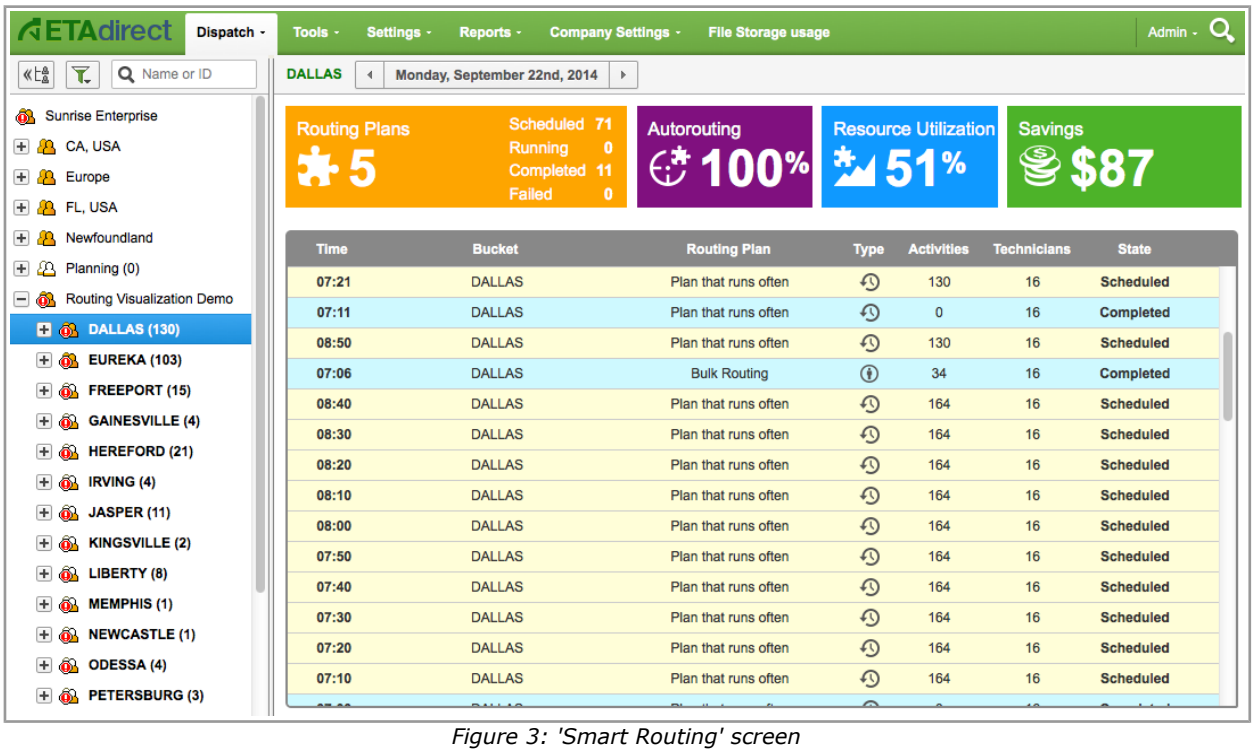


Figure 3: 'Smart Routing' screen

The calendar widget in the top part of the screen is used to select the date for which Routing data is to be displayed.

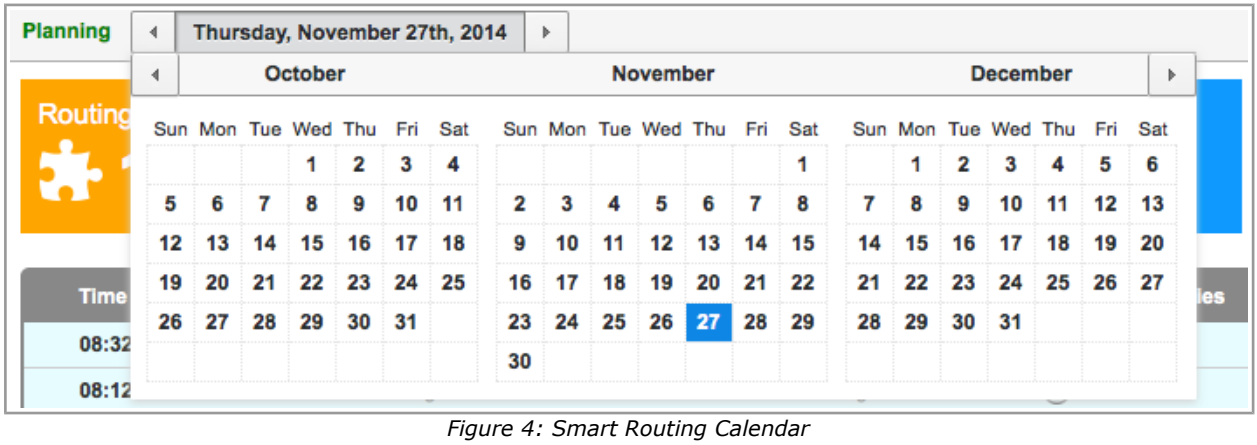


Figure 4: Smart Routing Calendar

The Resource Tree in the left part of the screen allows selecting buckets for which data is to be displayed. When a bucket is selected, the screen shows the Routing status of such bucket. The Resource Tree has a hierarchical structure, that is, when a parent bucket or group is selected, the screen shows aggregated data of its child buckets.

4.1 Configuration

The 'Routing Visualization' feature is, in fact, another form of visual representation of the Routing progress and results. It is based on the same functionality and, therefore, the underlying Routing configuration (Routing Profiles and Plans, Resource Types, Statistics Parameters, Activity Types, etc.) is the same, whether Routing Visualization is used or not.

However, the enhanced functionality allows to actually see the savings achieved for the selected bucket as the result of Routing runs. This requires setting of the average company parameters based on the existing statistics of the company business. In Oracle Field Service Cloud these parameters are called 'Baseline Settings'.

The user's ability to set or modify the 'Baseline Settings' is controlled by the 'Smart Routing Baseline settings' permission.

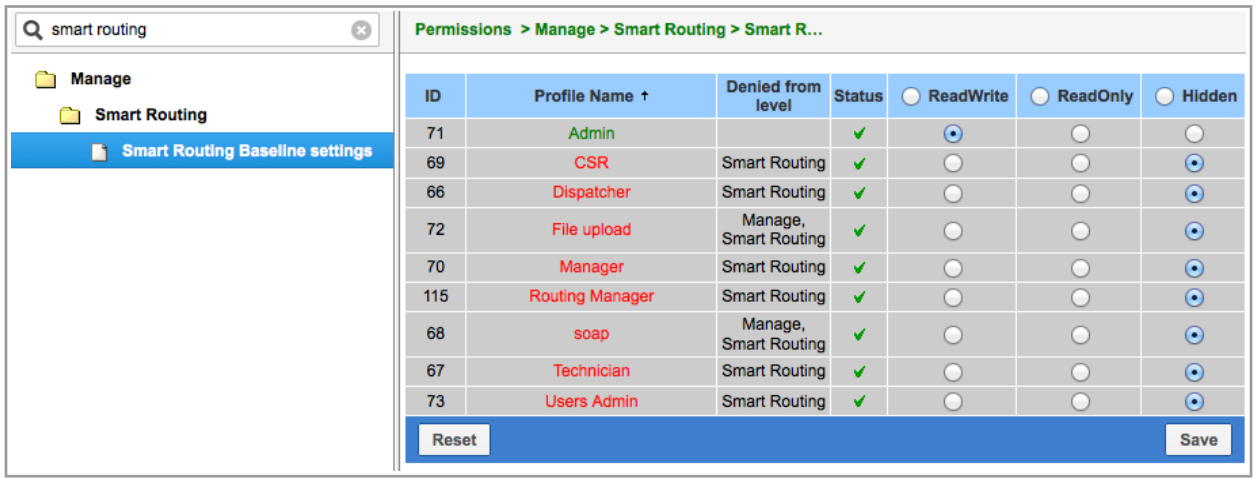


Figure 5: 'Smart Routing Baseline settings' permission

When the permission is set to ReadOnly or Hidden, the user is unable to edit the 'Baseline Settings'.

The 'Baseline Settings' can be found in the drop-down menu appearing on a click on the 'Savings' block on the 'Smart Routing' screen.

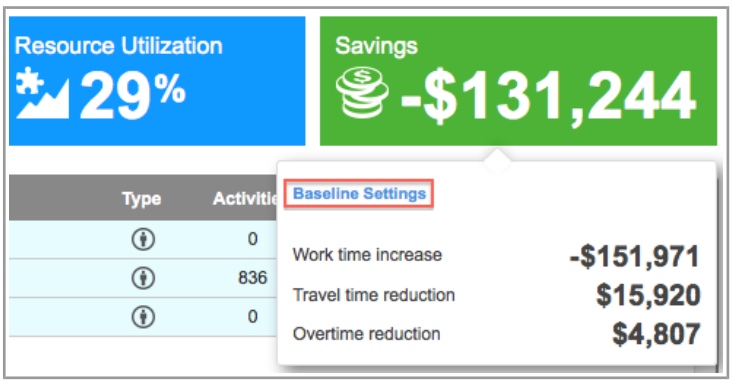


Figure 6: 'Baseline Settings' link

Clicking the 'Baseline Settings' link opens the list of parameters which need to be configured for the savings to be calculated and displayed.

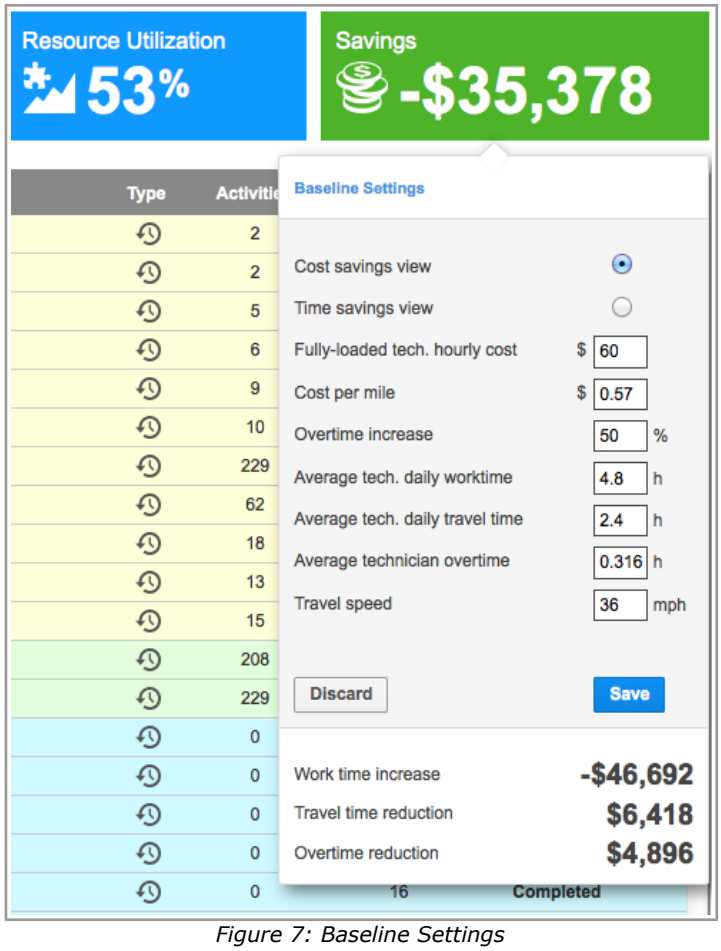


Figure 7: Baseline Settings

The following parameters are to be set:

- **Fully-loaded tech. hourly cost** (cost of 1 hour of the resource's work based on the resource's salary, benefits, training, overhead costs, equipment costs or depreciation) in US dollars. When the 'Time savings view' is selected, this setting is disabled as it has no influence on time savings
- **Cost per mile** (cost of 1 mile of the resource's travel) in US dollars. When the 'Time savings view' is selected, this setting is disabled as it has no influence on time savings
- **Overtime increase** (resource's hourly cost increase in case of overtime) in per cent
- **Average tech. daily worktime** (average time the resource spends on activities performance in a day) in hours
- **Average tech. daily travel time** (average time the resource spends on travel between activities in a day) in hours
- **Average technician overtime** (average acceptable overtime per resource) in hours
- **Travel speed** (average speed with which resources travel) in miles per hour

4.2 Summary Bar

The Summary Bar shows the Routing results for the selected bucket or group. In each case, the data

shown in the Summary Bar is the aggregated data of all individual resources' routes created as the result of Routing runs.

Figure 8: Summary Bar

Note: the 'Resource Utilization' and 'Savings' blocks also show data for individual resources (technicians), when such resources are selected in the Resource Tree. These parameters are calculated per each resource and aggregated when a bucket or group is selected.

4.2.1 Routing Plans

The Routing Plans block shows the number of scheduled Routing Plans, number of currently running Routing Plans, number of completed and failed Routing Plans. The number next to the 'puzzle' icon is the number of Routing Plans assigned to the selected bucket.

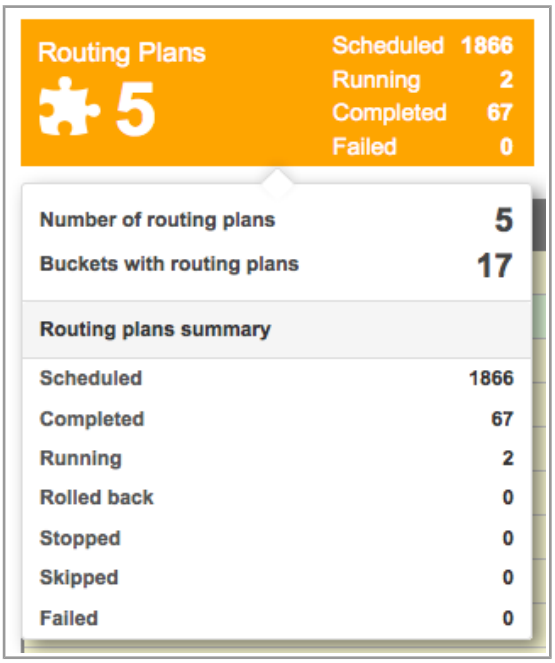


Figure 9: Routing Plans' block

Clicking the 'Routing Plans' block opens the summary of Routing Plans assigned to the selected bucket and their statuses. The following data is displayed:

- **Number of routing plans** – total number of Routing Plans assigned to the selected bucket and its child buckets
- **Buckets with routing plans** – number of child buckets to which at least one Routing Plan is assigned. If the selected bucket has no child buckets, this parameter shows '1'
- **Routing plans summary** – aggregated data of the statuses of the Routing Plans assigned to the selected bucket. The following statuses are available:

- **Scheduled** (Routing Plans to be run according to the schedule)
- **Completed** (finished Routing Plans)
- **Running** (Routing Plans run currently in progress)
- **Rolled back** (Routing Plan runs the results of which were not accepted by the user. When a Routing Plan run is rolled back, all activities are returned to the bucket and can be assigned again in the next Routing Plan run)
- **Stopped** (Routing Plan runs interrupted manually)
- **Skipped** (finished Routing Plan runs in which no activities were assigned, for example, due to absence of activities in the bucket)
- **Failed** (Routing Plan runs in which no server response was received)

4.2.2 Autorouting

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

The figures shown in the 'Autorouting' block are aggregated results of all resources in the selected bucket and its child buckets, if any. If no activities were routed manually, the Autorouting efficiency is 100%.

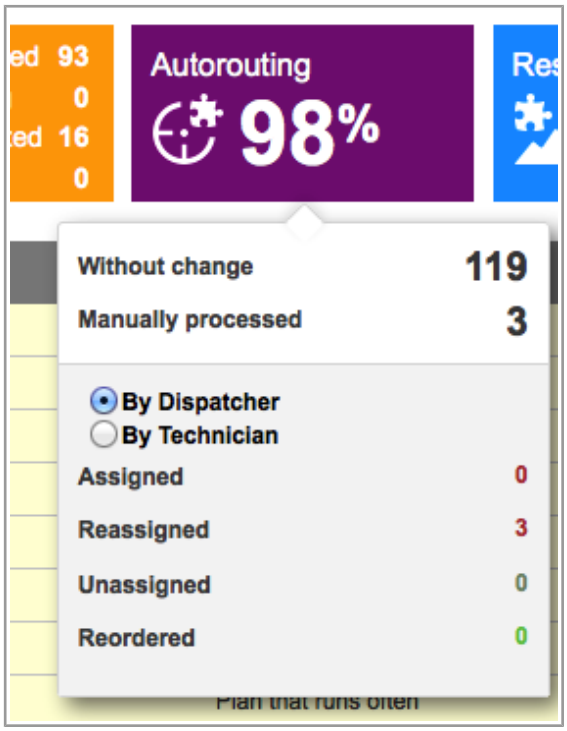


Figure 10: 'Autorouting' block

The 'Autorouting' drop-down contains the following data:

- **Without change** (number of auto-routed activities)
- **Manually processed** (number of manually routed activities)

Note: the sum of 'Without change' and 'Manually processed' is the total number of activities routed in the selected bucket.

- **By Dispatcher / By Technician** (selector allowing to view the number of manual operations performed by the dispatcher or by the technician). This section contains the breakdown of manual operations in the following types:
- **Assigned** (activities moved from the bucket to resources' routes)
- **Reassigned** (activities moved between resources)
- **Unassigned** (activities moved from resources' routes to the bucket)
- **Reordered** (activities moved to a different position in the route). The 'Reordered' category is not available when the 'By Technician' option is selected

4.2.3 Resource Utilization

The 'Resource Utilization' block shows the efficiency of resources working time use in per cent. The resource utilization ratio is calculated as the ratio of the actual resource useful time to the useful time defined by the baseline settings. The figure shown in the block is the aggregated result of all routes created as the result of Routing in the selected bucket.

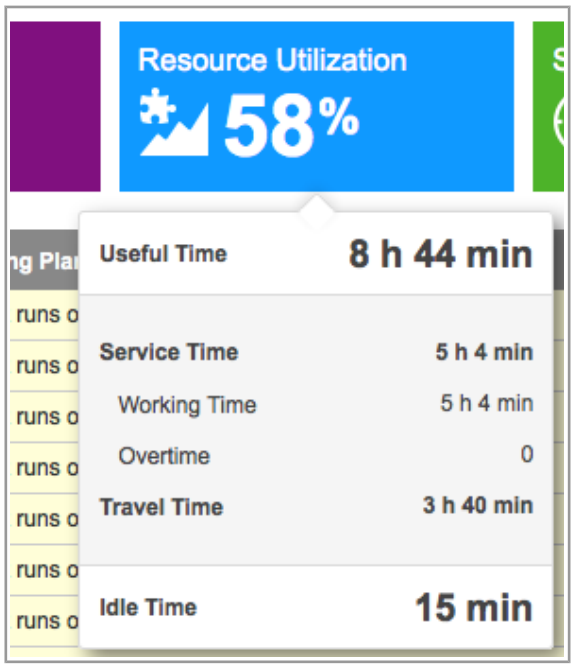


Figure 11: 'Resource Utilization' block

The 'Useful Time' shown in the 'Resource Utilization' drop-down window consists of the 'Service Time'

and 'Travel Time'. In its turn, the 'Service Time' consists of the 'Working Time' (the time spent by the resources for actual activities performance) and the 'Overtime'.

The window also includes the 'Idle Time' created as the result of the Routing run which is the waiting time between activities.

4.2.4 Savings

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

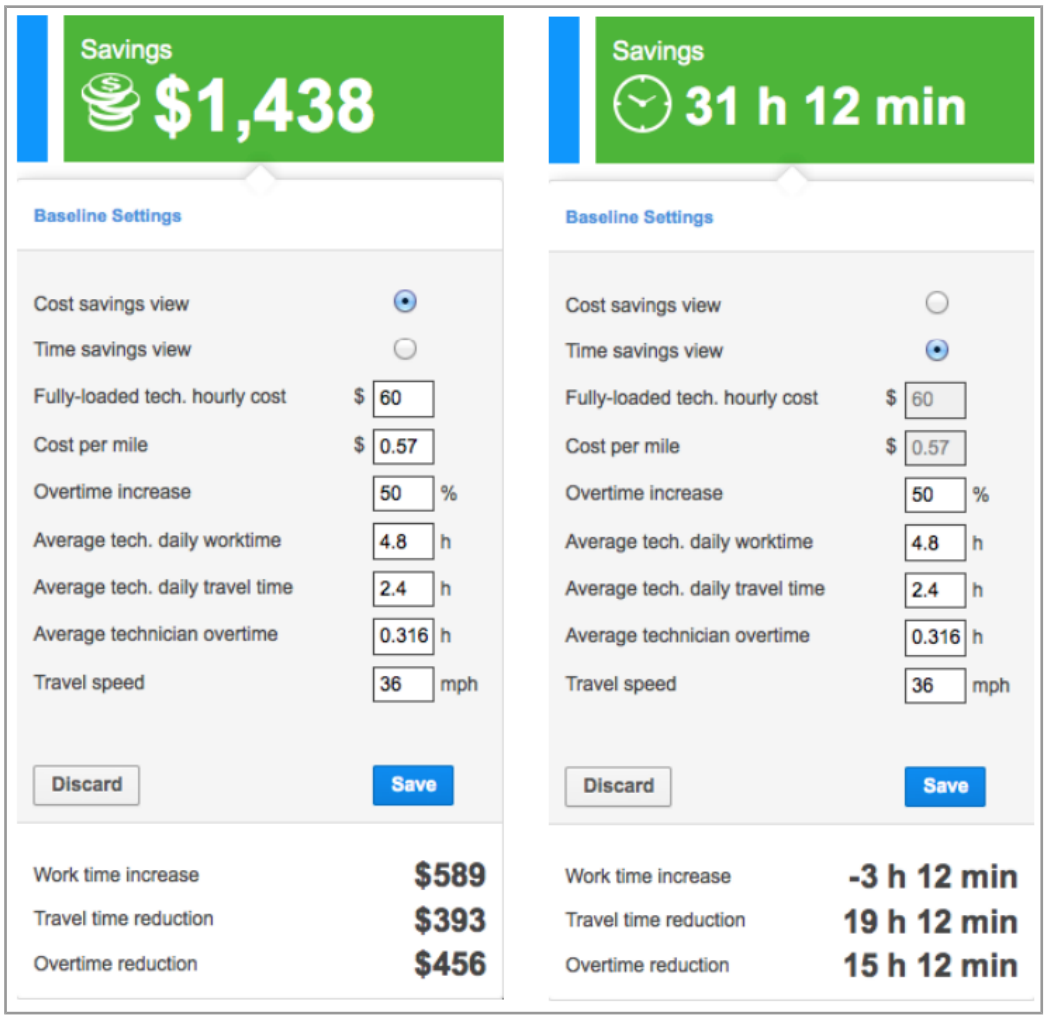


Figure 12: 'Savings' block: Cost savings view (left) and Time saving view (right)

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

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

- **Travel time reduction** (reduction of the time spent on travel between activities) which can be represented as actual time in hours and minutes (Time savings) or converted to money according to the Baseline Settings (Cost savings)
- **Overtime reduction** (reduction of the overtime created for the resources as the result of Routing run) which can be represented as actual time in hours and minutes (Time savings) or converted to money according to the Baseline Settings (Cost savings)

The value in the 'Savings' block is the sum of the above-mentioned three values.

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

5 Manual and Automatic Routing Run

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

5.1 Manual Routing Run

The 'Activities' screen (Time View, List View and Map View) now has a button allowing to start a Routing Plan manually for a bucket. When a bucket is selected in the Resource Tree, a 'puzzle' button appears next to the bucket name in the 'Activities' view.

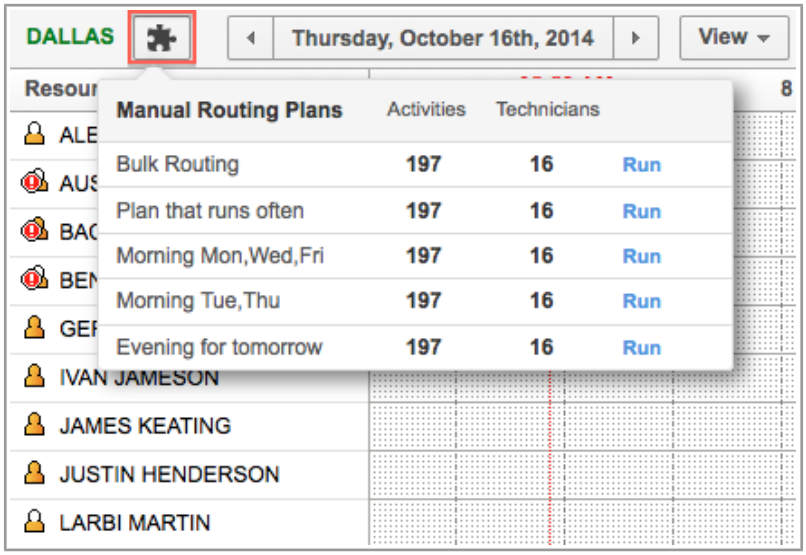


Figure 13: Button allowing to select and start Routing Plan

Note: when a resource other than bucket is selected, this button is hidden.

The button is controlled by the general 'Routing' permission and the 'Smart Routing' permission. When either or both permissions are disabled for the user, the 'puzzle' button is hidden, therefore, the user is unable to start routing plans manually.

Clicking on the 'puzzle' button opens the list of all routing plans assigned to the bucket. The list also

shows the number of non-assigned activities in the bucket and the number of available technicians. The 'Run' link against each Routing Plan name allows starting the Routing Plan manually. When 'Run' is clicked, a confirmation window appears where the user is requested to confirm that the selected plan is to be started manually.

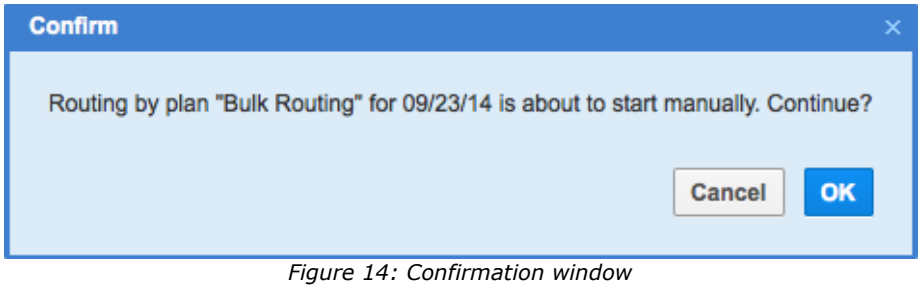
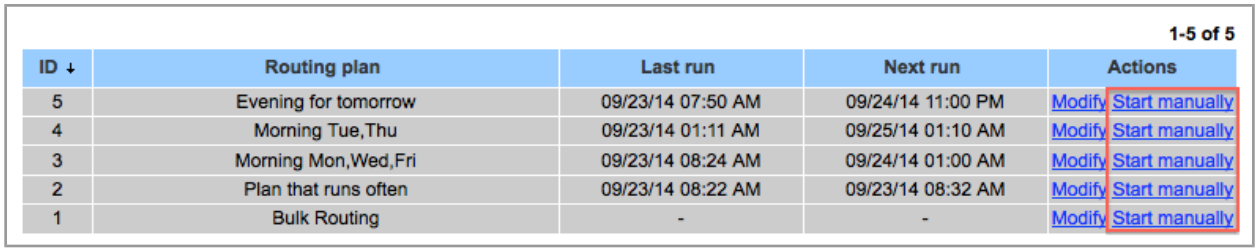


Figure 14: Confirmation window

The 'Manual Routing Plans' list corresponds to the Routing Plans list in the 'Routing' window where each Routing Plan can similarly be started by clicking 'Start manually'.



1-5 of 5

ID ↓	Routing plan	Last run	Next run	Actions
5	Evening for tomorrow	09/23/14 07:50 AM	09/24/14 11:00 PM	Modify Start manually
4	Morning Tue,Thu	09/23/14 01:11 AM	09/25/14 01:10 AM	Modify Start manually
3	Morning Mon,Wed,Fri	09/23/14 08:24 AM	09/24/14 01:00 AM	Modify Start manually
2	Plan that runs often	09/23/14 08:22 AM	09/23/14 08:32 AM	Modify Start manually
1	Bulk Routing	-	-	Modify Start manually

Figure 15: Routing Plans list in 'Routing' window

When a Routing Plan has been started manually, the 'Manual Routing' window appears.

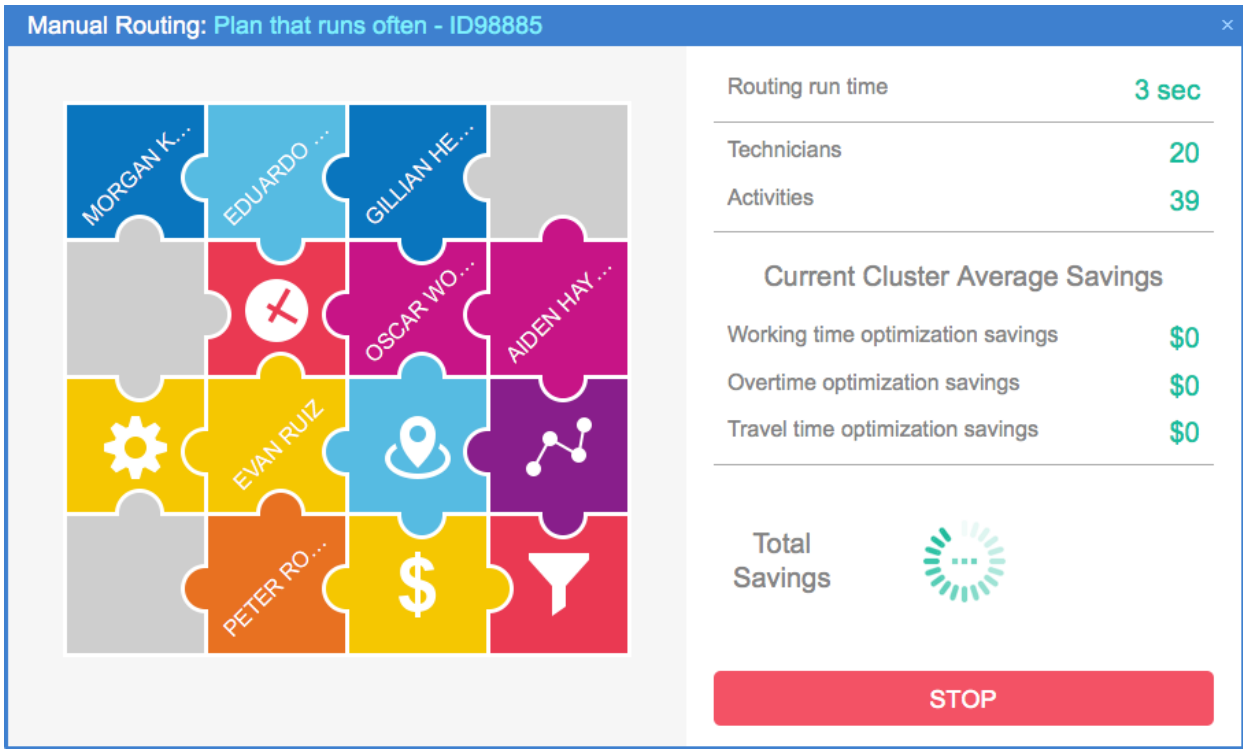


Figure 16: 'Manual Routing' window

The title of the 'Manual Routing' window contains the Routing Plan name and ID. During the Routing Plan run the window shows a shuffling puzzle representing the Routing run progress. The right-hand part of the window shows the Routing run statistics. The current Routing run can be interrupted by clicking 'Stop'. When a Routing run is interrupted, all activities remain in the bucket.

The effect of the 'Stop' button is the same as that of the 'Stop process' action link in the 'Routing execution log' which stops a running Routing Plan returning all activities to the bucket.

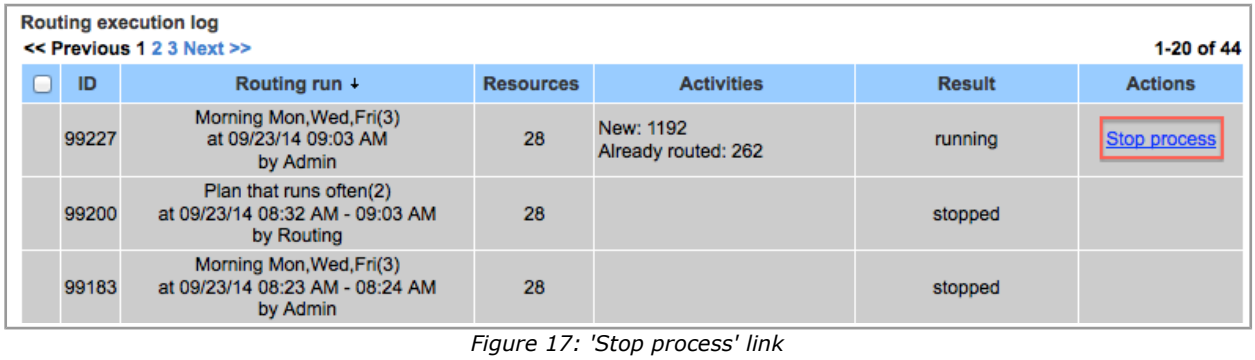


Figure 17: 'Stop process' link

When the Routing Plan run has been completed, the results window is displayed.

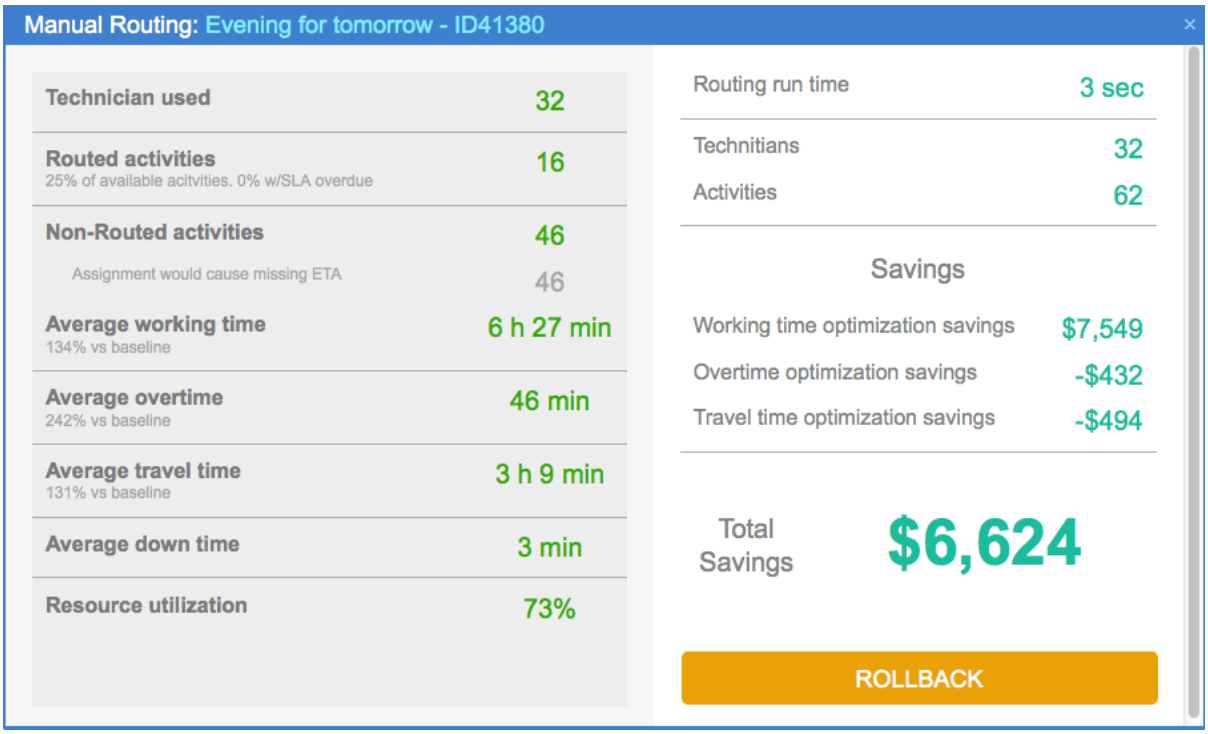


Figure 18: Manual Routing results window

The manual Routing results window shows the following data:

- **Technicians used** (the total number of resources to which activities have been assigned)
- **Routed activities** (the total number of activities assigned by Routing). This section also includes the percentage of the assigned activities in the total number of activities in the bucket

and the percentage of activities assigned with SLA overdue

- **Non-Routed activities** (the total number of activities not assigned by Routing in the current run with their breakdown by non-routing reasons)
- **Rejected activities** (the number of activities which could never be assigned in the current conditions and the reasons for their non-assignment. For example, if some activities cannot be assigned as no resource in the selected bucket meets all their requirements, such activities will be rejected). The number of rejected activities is included in the total number of non-routed activities
- **Average working time** (the average time resources spend on performing activities in a working day and its ratio against the baseline figure)
- **Average overtime** (the average overtime created as the result of the Routing run and its ratio against the baseline figure)
- **Average travel time** (the average travel to be performed by resources as the result of the Routing run and its ratio against the baseline figure)
- **Average down time** (the average idle time created as the result of the Routing run and its ratio against the baseline figure)
- **Resource utilization** (efficiency of resources working time use in per cent)
- **Routing run time** (time in which the Routing run was completed)
- **Technicians** (total number of resources in the bucket)
- **Activities** (total number of activities in the bucket)
- **Savings** (financial savings achieved by the Routing run) broken down into:
    - **Working time optimization savings** (savings achieved as the result of resources' working time increase)
    - **Overtime optimization savings** (savings achieved as the result of overtime reduction)
    - **Travel time optimization savings** (savings achieved as the result of travel time reduction)

  The '**Total savings**' figure is the sum of 'Working time optimization savings', 'Overtime optimization savings' and 'Travel time optimization savings'.

Upon the Routing run completion, its results are immediately applied, that is, the activities are placed in the resources' routes. If needed, the Routing run results can be rejected by clicking 'Rollback' (the activities will be returned to the bucket). The 'Rollback' action is similar to that of the 'Rollback' action link of the 'Routing execution log' on the 'Routing' screen.

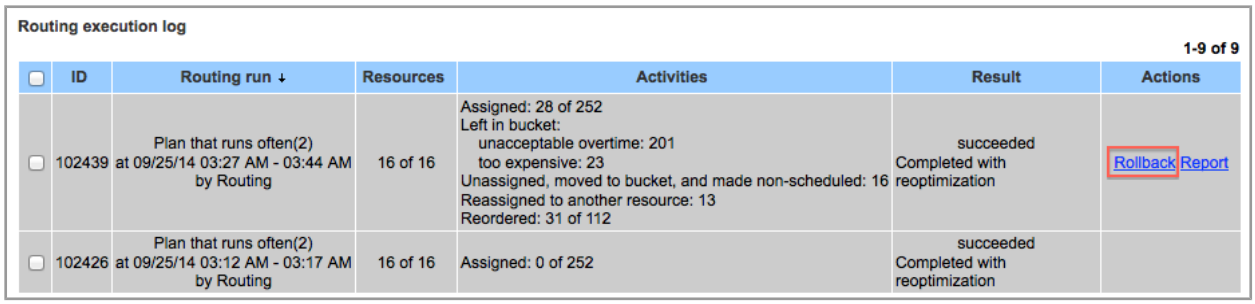


Figure 19: 'Rollback' action link in 'Routing execution log'

5.2 Automatic Routing Run

Automatic Routing runs require no user actions to start. When a Routing Plan is run automatically, no popup windows appear. The 'Routing Plans' block on the 'Smart Routing' screen shows the number of currently running Routing Plans and they are also shown in the 'Running' status in the Routing execution log. Clicking the line of a running Routing Plan opens the 'Automatic Routing' window with the behavior and functionality similar to that of the 'Manual Routing' window described above.

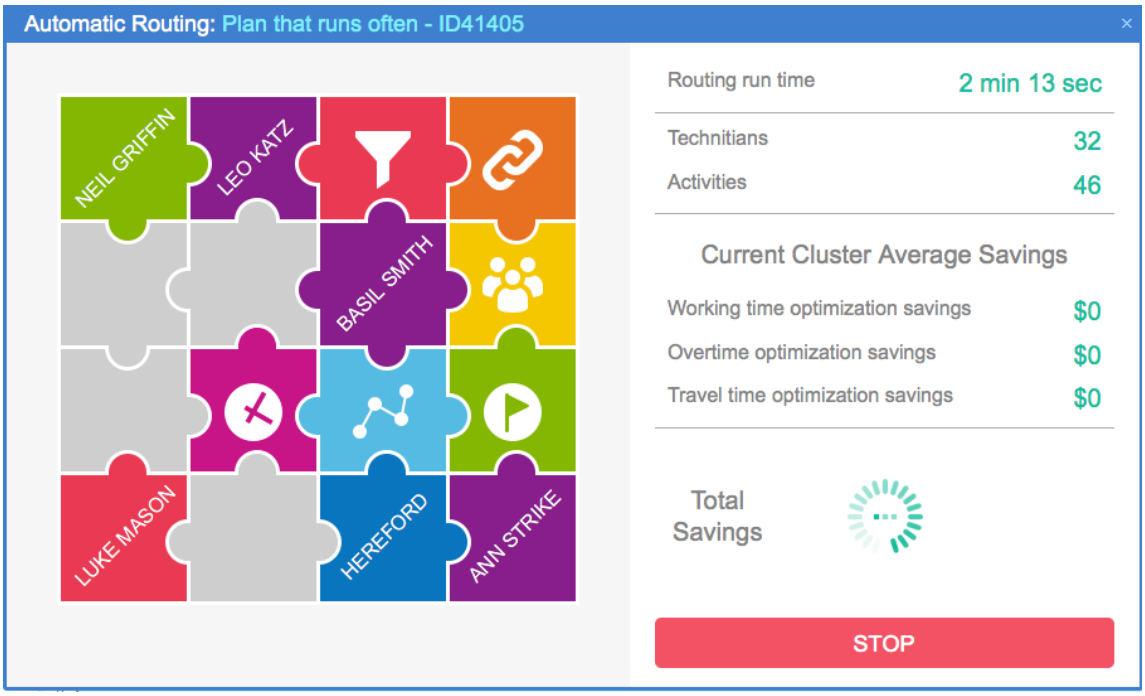


Figure 20: 'Automatic Routing' window

6 Routing Execution Log

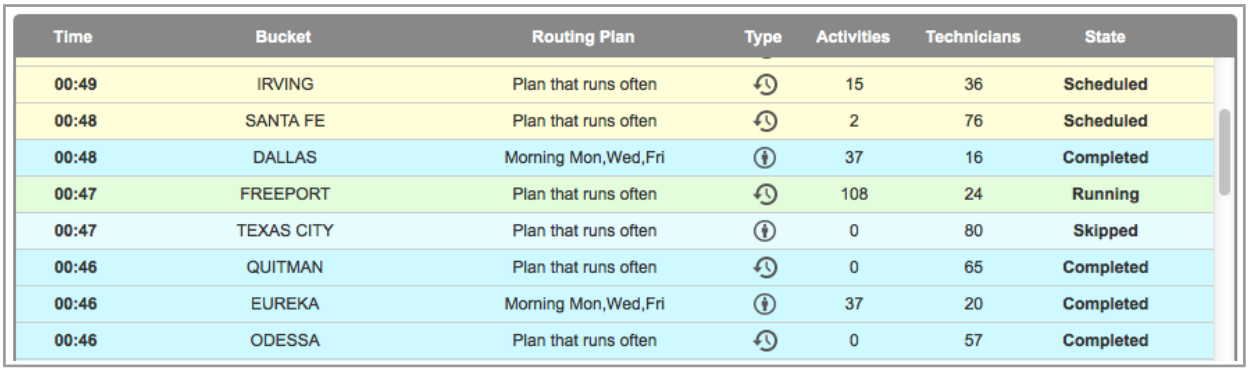
The Routing execution log is organized as a table with the following columns:

- **Time** (time of the Routing run. When this column shows only the time, the Routing run belongs to the current day. When both date and time are shown, the Routing run belongs to a day in the past)
- **Bucket** (bucket from which activities are assigned)

- **Routing Plan** (name of the Routing Plan)
- **Type** (automatic ( ) or manual ( ))
- **Activities** (number of assigned activities (for 'Completed' Routing Plans) or the number of activities in the bucket (for Routing Plans of other statuses))
- **Technicians** (number of resources to which activities have been assigned (for 'Completed' Routing Plans) or the number of technicians under the bucket (for Routing Plans of other statuses))
- **State** (Routing Plan run status)

The following Routing Plan statuses are available:

- **Scheduled** (Routing Plan to be run according to the schedule)
- **Completed** (finished Routing Plan)
- **Running** (Routing Plan run currently in progress)
- **Rolled back** (Routing Plan run the results of which were not accepted by the user. When a Routing Plan run is rolled back, all activities are returned to the bucket and can be assigned again in the next Routing Plan run)
- **Stopped** (Routing Plan run interrupted manually)
- **Skipped** (finished Routing Plan run in which no activities were assigned, for example, due to absence of activities in the bucket)
- **Failed** (Routing Plan run in which no server response was received)



Time	Bucket	Routing Plan	Type	Activities	Technicians	State
00:49	IRVING	Plan that runs often		15	36	Scheduled
00:48	SANTA FE	Plan that runs often		2	76	Scheduled
00:48	DALLAS	Morning Mon,Wed,Fri		37	16	Completed
00:47	FREEPORT	Plan that runs often		108	24	Running
00:47	TEXAS CITY	Plan that runs often		0	80	Skipped
00:46	QUITMAN	Plan that runs often		0	65	Completed
00:46	EUREKA	Morning Mon,Wed,Fri		37	20	Completed
00:46	ODESSA	Plan that runs often		0	57	Completed

Figure 21: Routing execution log

Clicking a Routing Plan line opens its status window. Different windows are displayed for Routing Plan runs of different statuses:

– **Scheduled** (the window contains the bucket name, the Routing run status (scheduled) and the date and time for which the Routing run is scheduled)

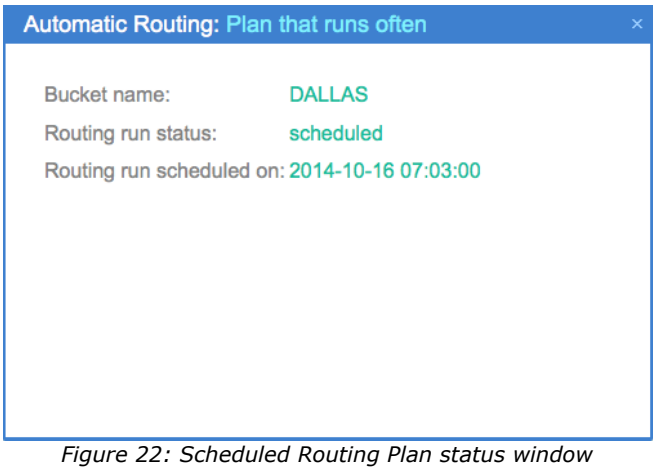


Figure 22: Scheduled Routing Plan status window

– **Completed** (the window contains the Routing run results and the 'Rollback' button to return activities to the bucket if needed)

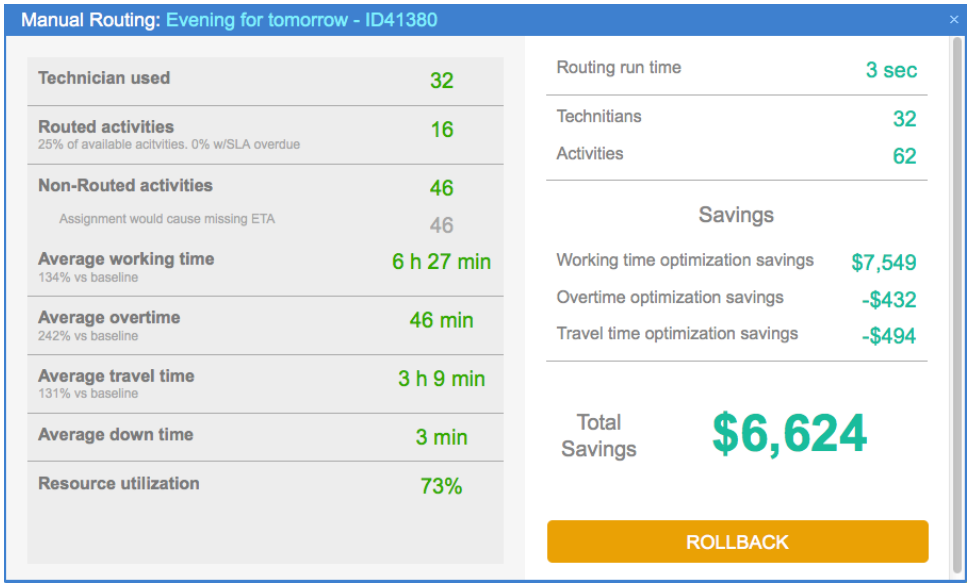


Figure 23: Completed Routing Plan status window

– **Running** (the window contains the Routing run statistics and the 'Stop' button to interrupt the process)

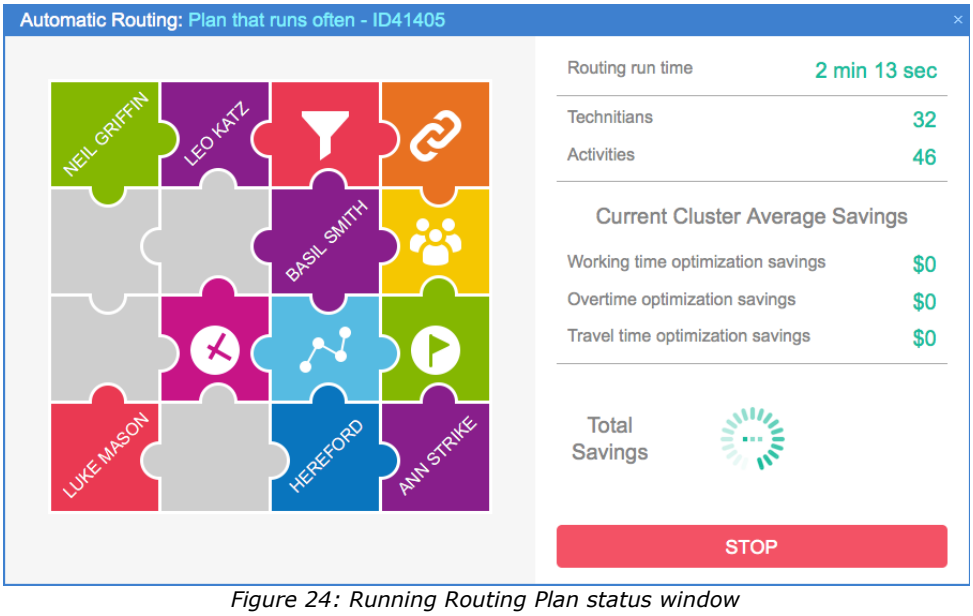


Figure 24: Running Routing Plan status window

– **Rolled back** (the window contains the bucket name, the Routing run status (rolled back) and the Routing run start and end date and time)

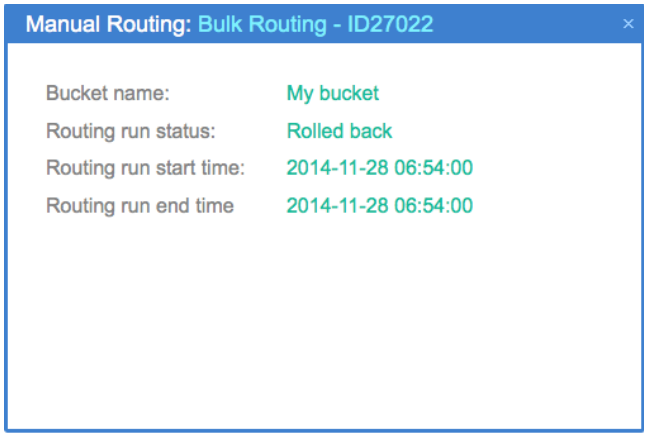


Figure 25: Rolled back Routing Plan status window

– **Stopped** (the window contains the bucket name, the Routing run status (stopped) and the Routing run start and end date and time)

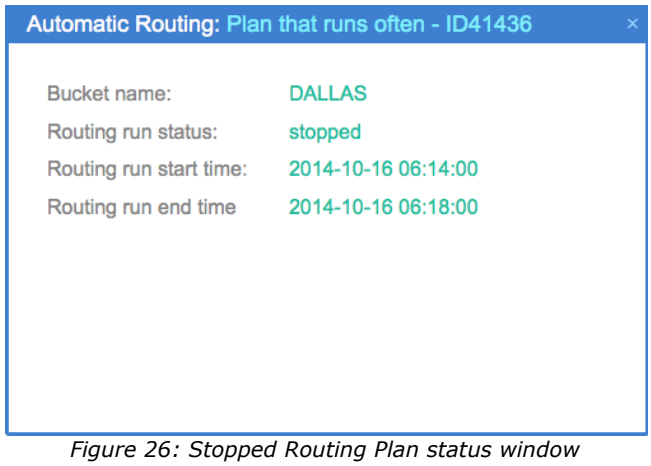


Figure 26: Stopped Routing Plan status window

– **Skipped** (the window contains the bucket name, the Routing run status (skipped), the description of the reason why the Routing Plan has been skipped and the Routing run start and end date and time)

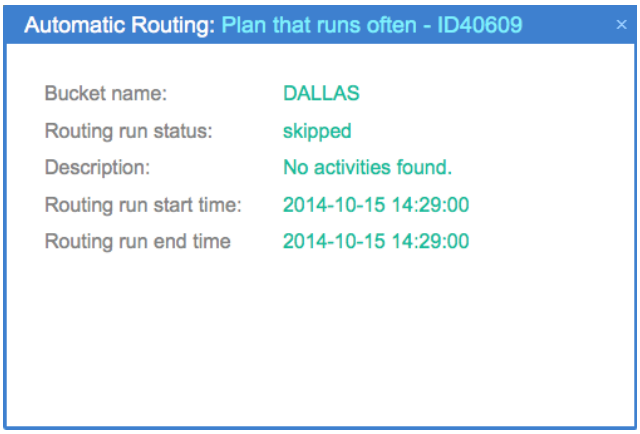


Figure 27: Skipped Routing Plan status window

– **Failed** (the window contains the bucket name, the Routing run status (failed), the description of the reason why the Routing Plan has failed and the Routing run start and end date and time)

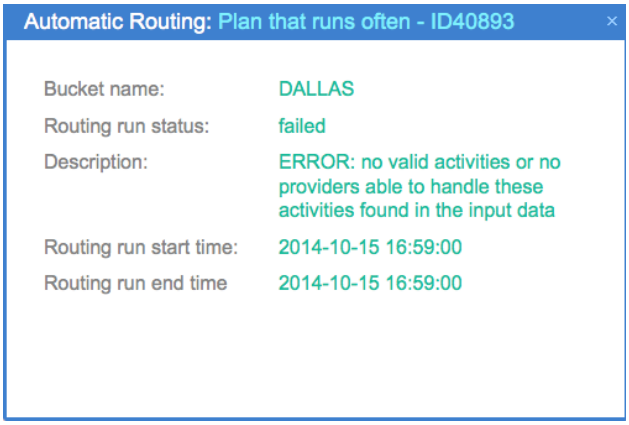


Figure 28: Failed Routing Plan status window