Solution format specification

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Note

This document details the file format used for MPVRP-CC solutions. To be validated, a solution must strictly follow the structure described below.

1 File format

Solutions are stored in text files with the `.dat` extension. The filename must reference the instance being solved (e.g., `Sol_MPVRP_...`).

2 File structure

The file describes the routes vehicle by vehicle. For each vehicle used, the solution contains a block of **2 lines**.

2.1 Line 1: visit sequence

```
Garage - Depot - Station(Qty) - ... - Garage
```

This line describes the path taken by the vehicle. The sequence starts and ends at the vehicle's home garage. Quantities delivered to stations are indicated in parentheses.

2.2 Line 2: product sequence and costs

```
Prod(Cost) - Prod(Cost) - ...
```

This line indicates which product is transported at each step and the associated changeover cost (if applicable). The changeover cost is 0 when the vehicle keeps the same product.

Important

The two lines must be perfectly aligned in terms of the number of steps. Each element in the visit sequence corresponds to exactly one element in the product sequence.

3 Valid solution example

```
1 - 3 - 8 ( 51 ) - 9 ( 63 ) - 1
3(0.0) - 3(0.0) - 3(0.0) - 3(0.0) - 3(0.0)

2 - 4 - 13 ( 18 ) - 2
2(0.0) - 2(0.0) - 2(0.0) - 2(0.0)
```

In this example:

- **Vehicle 1** starts at garage 1, loads at depot 3, delivers 51 units to station 8, then 63 units to station 9, and returns to garage 1. It carries product 3 throughout the route with no changeover cost.
- **Vehicle 2** starts at garage 2, loads at depot 4, delivers 18 units to station 13, and returns to garage 2. It carries product 2 throughout with no changeover cost.

4 Solution metrics

After all vehicle routes, the file ends with **6 lines** of performance metrics:

```
2
7
55.66
1385.07
Intel Core i7-10700K
0.245
```

4.1 Line 1: number of vehicles used

```
2
```

Number of vehicles with at least one delivery.

4.2 Line 2: number of product changes

```
7
```

Total number of product changes across the entire solution.

4.3 Line 3: total transition cost

```
55.66
```

Sum of all product changeover costs for all vehicles.

4.4 Line 4: total distance

```
1385.07
```

Total distance traveled by the fleet (sum of Euclidean distances).

4.5 Line 5: processor

```
Intel Core i7-10700K
```

Model of the processor on which the solution was generated.

4.6 Line 6: resolution time

```
0.245
```

Time elapsed to generate the solution (in seconds).

A valid solution must satisfy all the constraints.