

# Route Optimization API

Route Optimization API - Patherizer (a solution to vehicle routing problem) is a cross browsers REST API supporting now a maximum of **100 stops per route or request** including the start destination and the end destination. Being a multi stop route optimization software, Patherizer may be used by multiple calls to calculate and optimize routes for multiple vehicles, each vehicle with its optimized route. The route optimization algorithm is based per TSP (travel salesman problem) and it always calculate the shortest route between current stop and the next stop until it reaches the end destination. The input addresses are geocoded, so the JSON response will include **latitude** and **longitude** of each stop. If the route optimization API cannot recognize one or more of the input addresses it will not geocode these inputs and the API request will return a JSON Error as specified in the errors table. The JSON response also includes distances between each stops along the optimized route (in miles or km) and most important, the duration (in seconds) and **duration in real traffic conditions** (in seconds) at the time you make the request. A total distance of the optimized route is computed and also a total time.

Although this Route Optimization API is intended for software development and therefore developers, we have also here an online application that may be used to get listed the optimized route from the input text basically you input start address, end address and multi stop addresses (no matter the order) along the route separated by "," Basically for Route Optimization API you send an authorized POST request in JSON format to the API endpoint and you get as JSON response a representing the optimized route in segments as you need to go. **You may use it for commercial purposes for paid packages.**

Route Optimization APP or API is useful for a large number of domains like: driving route optimizer, delivery routing software, vehicle routing problem, fleet routing software etc.

For using our API and/or APP you must [create an account](#) (free of charge, no card required), activate it from your received email, login and then start your TRIAL package with no fees as you can see at our [pricing packages](#). After you have tested the text to speech readear API and/or APP and if you are satisfied, you may buy a paid package. You will always see at your Admin Console page the real resources consumption in real time, your invoices, you may see/edit/delete your profile or export log consents as GDPR instructed, you may read our FAQs.

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# Route Optimization APP

Type the start address, for example: 38 Woodley Road Northwest, Washington DC

---


Type the end address, for example: 5051 Klinge Street Northwest, Washington, DC

---

Enter here the multi stop addresses on the route (DO NOT include here start and end addresses) separated by ';' as the last address will NOT be followed by ';' For example: 2700 Wisconsin Avenue Northwest, Washington DC;3601 Macomb Street Northwest, Washington DC;3511 Lowell Street Northwest, Washington

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Distance Units:

km 

Get JSON response from our API



Endpoint (method POST):

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## Headers:

```
Authorization: Basic //Your username:password are base64 encoded string
Content-Type: application/json
Accept: application/json
```

## JSON Request Body (change inputs here and see in real time below):

```
{
  "start_address": "38th St NW & Woodley Rd NW, Washington, DC",
  "end_address": "5051 Klingle St NW, Washington, DC",
  "addresses": "2700 Wisconsin Avenue Northwest, Washington DC;3601 Macomb Street Northwest, Washington DC",
  "units": "km"
}
```

## JSON Response From API (change inputs here and see in real time below):

```
{
  "segments": [
    {
      "origin": "38th St NW & Woodley Rd NW, Washington, DC 20016, USA",
      "destination": "3601 Macomb St NW, Washington, DC 20016, USA",
      "origin_latitude": 38.93202,
      "origin_longitude": -77.07422,
      "destination_latitude": 38.933712,
      "destination_longitude": -77.07113,
      "distance": 432.0,
      "time": 115,
      "time_in_traffic": 90,
      "toll": ""
    },
    {
      "origin": "3601 Macomb St NW, Washington, DC 20016, USA",
      "destination": "3511 Lowell St NW, Washington, DC 20016, USA",
      "origin_latitude": 38.933712,
      "origin_longitude": -77.07113,
      "destination_latitude": 38.9328,
      "destination_longitude": -77.06978,
      "distance": 222.0,
      "time": 47,
      "time_in_traffic": 46,
      "toll": ""
    },
    {
      "origin": "3511 Lowell St NW, Washington, DC 20016, USA",
      "destination": "2700 Wisconsin Ave, Washington, DC 20007, USA",
      "origin_latitude": 38.9328,
      "origin_longitude": -77.06978,
      "destination_latitude": 38.92476,
      "destination_longitude": -77.073616,
      "distance": 1108.0,
      "time": 203,
      "time_in_traffic": 150,
      "toll": ""
    },
    {
      "origin": "2700 Wisconsin Ave, Washington, DC 20007, USA",
      "destination": "5051 Klingle St NW, Washington, DC 20016, USA",
      "origin_latitude": 38.92476,
      "origin_longitude": -77.073616,
      "destination_latitude": 38.9317
```



```
    "destination_latitude": 38.9317,  
    "destination_longitude": -77.1025543,  
    "distance": 3316.0,  
    "time": 471,  
    "time_in_traffic": 411,  
    "toll": ""  
  }  
],  
"total_distance": 5078.0,  
"total_time": 836,  
"total_time_in_traffic": 697,  
"totals_summary": "Total Distance [km]=5,078; Total time [hh:mm]=0:14; Total time in traffic [hh:mm]=
```

## JSON Response (Example) From API in case of ERROR:

```
{  
  "cd": "1001",  
  "description": "The authorization header is either empty or isn't Basic"  
}
```

## Optimized Route Sorted Segments

### Origin

38th St NW & Woodley Rd NW, Washington, DC 20016, USA

### Destination

3601 Macomb St NW, Washington, DC 20016, USA

### Distance

0.43 km

### Duration

00:01:55

### Duration in Traffic

00:01:30

### Tolls

null

### Origin

3601 Macomb St NW, Washington, DC 20016, USA

### Destination

3511 Lowell St NW, Washington, DC 20016, USA

### Distance

0.222 km



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:47

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**Duration in Traffic**

00:00:46

**Tolls**

null

**Origin**

3511 Lowell St NW, Washington, DC 20016, USA

**Destination**

2700 Wisconsin Ave, Washington, DC 20007, USA

**Distance**

1.108 km

**Duration**

00:03:23

**Duration in Traffic**

00:02:30

**Tolls**

null

**Origin**

2700 Wisconsin Ave, Washington, DC 20007, USA

**Destination**

5051 Klingle St NW, Washington, DC 20016, USA

**Distance**

3.316 km

**Duration**

00:07:51

**Duration in Traffic**

00:06:51

**Tolls**

null

**Request Parameters Table**

***Parameter Name***

***Parameter Description***

**start\_address**

This is the input start address [string] typed in plain text that will be used as the first point of interest.  
Example: *38 Woodley Road North*



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**end\_address**

This is the input end address [**string**] typed in plain text that will be used as the last point of the optimized route. If you want to return to the start point you may input the same address as the start address. Example: *5051 Kingle Street Northwest, Washington, DC*

**addresses**

These are all the addresses [**string**] along the route separated by ";" Maximum 98 addresses, so that means a maximum of **100 addresses** per request per route if we consider also the start and the end addresses. Don't type here start address and end address, only addresses between, no matter the order. Example:

*2700 Wisconsin Avenue Northwest, Washington DC;3601 Macomb Street Northwest, Washington DC; 3511 Lowell Street Northwest, Washington*

**units**

This parameter defines which units [**string**] will be considered calculating the distance between each route segment origin and destination. Its values may be **km** or **mi** so it means kilometers or miles.

## Response Parameter Table

**Parameter Name**

**Parameter Description**

**optimized\_route**

This is the *RootObject* (not a parameter) that includes an array field called *segments* and four other fields *total\_distance* (in km or mi), *total\_time* (in seconds), *total\_time\_in\_traffic* (in seconds) and *totals\_summary* (string). These fields will be detailed below.

**segments**

This is an array containing each segment of the optimized route. The segments are sorted from the first to the last in the order the optimized route must be passed. The array contains the following fields: *origin*, *origin\_latitude*, *origin\_longitude*, *destination*, *destination\_latitude*, *destination\_longitude*, *distance*, *time*, *time\_in\_traffic*, *toll*, each of the fields is explained below.

**origin**

This is the origin address [**string**] of the segment. Example: *2700 Wisconsin Avenue Northwest, Washington DC*

**destination**

This is the destination address [**string**] of the segment. Example: *3511 Lowell Street Northwest Washinaton*

**in\_latitude**

This is the origin latitude of the segment. It may be a negative number. Example: *40.243367*

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<b>origin_longitude</b>	This is the origin longitude of the segment as [real] number. It may be a negative number. Example: <i>20.293886</i>
<b>destination_latitude</b>	This is the destination latitude of the segment as [real] number. It may be a negative number. Example: <i>41.549527</i>
<b>destination_longitude</b>	This is the destination longitude of the segment as [real] number. It may be a negative number. Example: <i>21.847597</i>
<b>distance</b>	This is the distance as [real] number between origin and destination of the segment as [meters]. Example: <i>5678</i>
<b>time</b>	This is the average time in [seconds] as [integer] number necessary to go from origin to destination of the segment. Example: <i>1227</i>
<b>time_in_traffic</b>	This is the real time in traffic conditions at the time the request has been made in [seconds] as [integer] number necessary to go from the origin to the destination of the segment. Example: <i>1325</i>
<b>toll</b>	This is the toll cost for travelling the segment as [string] number. If not present it will be null. Example: <i>5.84 USD</i>
<b>total_distance</b>	This is the total distance of the optimized route as [real] number in [meters]. Example: <i>5843</i>
<b>total_time</b>	This is the total average time to travel the optimized route as [real] number in [seconds]. Example: <i>57643</i>
<b>total_time_in_traffic</b>	This is the total time in real traffic conditions at the moment you make the request to travel the optimized route as [real] number in [seconds]. Example: <i>55893</i>
<b>totals_summary</b>	This is a summarizing field [string] for total distance (in [km] or [mi]) depending of the value of the <i>units</i> parameter from request, total average time as [hh:mm] and total time in real traffic conditions [hh:mm] at the moment you make the request to travel the optimized route. Example: <i>Total Distance [km]=5,078; Total time [hh:mm]=0:14; Total time in traffic [hh:mm]=0:12</i>

## [Response Error Codes Table](#) [Error Codes Table](#)

### **Parameter Name**

### **Parameter Description**

This is the error code which may be:

■ 1001

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- 1002
- 1003
- 1004
- 1005
- 1006
- 1007
- 1008
- 1009
- 1010
- 1011
- 1012
- 1013
- 1014
- 1015
- 2001

## description

This is the description of the error code which may be:

- 1001 - The authorization header is either empty or isn't Basic.
- 1002 - Daily requests number exceeded in TRIAL mode!
- 1003 - Trial expired!
- 1004 - Addresses number exceeded!
- 1005 - Package expired!
- 1006 - No invoice!
- 1007 - Reader is NULL for TRIAL!
- 1008 - Cannot Read if TRIAL exists!
- 1009 - Error connecting to database looking for TRIAL! (and a detailed description message of the encountered error)
- 1010 - Reader is NULL for Invoice!
- 1011 - Cannot Read if Invoice exists!
- 1012 - Error connecting to database! (and a detailed description message of the encountered error)
- 1013 - Input request string too long! Maximum 100 addresses per request are allowed
- 1014 - Invalid request data! (and a detailed description message of the encountered error)
- 1015 - The request cannot exceed 100 addresses!
- 2001 - Invalid request data after passing to the API (and a detailed description message of the encountered error)

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VB.NET

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```

Imports System.IO
Imports System.Net
Imports System.Web.Script.Serialization

Public Class route_optimization_api
    Inherits System.Web.UI.Page
    Public Structure RequestFields
        Dim start_address As String
        Dim end_address As String
        Dim addresses As String
        Dim units As String
    End Structure

    Public Structure ResponseFields
        Dim segments As New Segment()
        Dim total_distance As Single
        Dim total_time As Integer
        Dim total_time_in_traffic As Integer
        Dim totals_summary As String
    End Structure

    Public Structure Segment
        Dim origin As String
        Dim destination As String
        Dim origin_latitude As Single
        Dim origin_longitude As Single
        Dim destination_latitude As Single
        Dim destination_longitude As Single
        Dim distance As Single
        Dim time As Integer
        Dim time_in_traffic As Integer
        Dim toll As String
    End Structure

    Public Structure ErrorFields
        Dim cd As String
        Dim description As String
    End Structure

    Protected Sub SendRequest()
        Dim Client As WebClient = New WebClient()
        Dim credentials As String = Convert.ToBase64String(Encoding.ASCII.GetBytes("your_username:your_password"))
        Client.Headers(HttpRequestHeader.Authorization) = String.Format("Basic {0}", credentials)
        Client.Headers(HttpRequestHeader.Accept) = "application/json"
        Client.Headers(HttpRequestHeader.ContentType) = "application/json"
        Client.BaseAddress = "https://www.de-vis-software.ro/roa.aspx"
        Dim j As RequestFields = New RequestFields()
        j.start_address = "38 Woodley Road Northwest, Washington DC!"
        j.end_address = "5051 Klinge Street Northwest, Washington, DC"
        j.addresses = "2700 Wisconsin Avenue Northwest, Washington DC;3601 Macomb Street Northwest, Washington DC"
        j.units = "km"

        Try
            Dim js As String = (New JavaScriptSerializer()).Serialize(j)
            Dim reqString As Byte() = Encoding.Default.GetBytes(js)
            Dim url As Uri = New Uri(Client.BaseAddress)
            Dim resByte As Byte() = Client.UploadData(url, "post", reqString)
            'The resString bel
            Dim resString As String = Encoding.Default.GetString(resByte)
            If Instr(resString, "total_distance") > 0 Then
                'In case we got it right without errors
                Dim r As ResponseField = New ResponseField()
                Dim j1 As JavaScriptSerializer = New JavaScriptSerializer()
                'Below we find in r.total_distance the value which may be
                'used in further calculations.
                r = j1.Deserialize(Of ResponseField)(resString)
            Else 'So in case of error occurrence
                Dim e As ErrorFields = New ErrorFields()
                Dim j2 As JavaScriptSerializer = New JavaScriptSerializer()
                'Below we find in e.cd (error code) and e.description
                e = j1.Deserialize(Of ErrorFields)(resString)
            End If
            Client.Dispose()
        Catch exception As System.Exception
            Dim ex As System.Exception = exception
        End Try
    End Sub

```

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```
Dim ex As System.Exception = exception
Console.WriteLine("ERROR: " & ex.Message)
End Try
End Sub
End Class
```

## Vehicle Routing Problem Video Presentation

Vehicle Routing Problem solved by Delivery Routing Software - Patherizer - is in the video presentation below. Our driving route optimizer or multi stop route optimizer is a very useful tool for any kind of activity that implies route optimization. You can use it as a standalone route optimization app or, as a developer, you can access it from your own app or apps.

### Route Optimization API



## Pricing Packages

Please choose one of the below pricing packages for start using our Route Optimization API and online APP!

***Start TRIAL***  
***No catches***

- 7 days TRIAL
- Use our cloud REST API and online APP
- **Maximum 10 addresses(\*) per each request**
- **Maximum 10 requests per DAY in trial period**
- **You do NOT own the commercial copyright in trial period.**

Get Optimized Route for input addresses

Get Geocoding(\*\*) data (latitude and longitude) for each

Get Distance [m] between each segment's origin and des

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- Get Average Time [seconds] between each segment's origin and destination of the optimized route
- Get Real Time In Traffic Conditions [seconds] (where available) at the moment you make the request between each segment's origin and destination of the optimized route
- Get Tolls for each segment of the optimized route (where available)
- Get Total Distance (km or mi) of the optimized route
- Get Total Average Time (hh:mm) of the optimized route
- Get Total Time In Real Traffic Conditions (hh:mm) of the optimized route
- For Fleet Vehicles Routing you may make requests for each vehicle, so each vehicle will get its optimized route
- Administration console
- Support through online chat and/or tickets
- **We do NOT allow spam accounts for TRIAL**

Try it Now!

## Monthly TIER Popular

- 90 USD per month
- Use our cloud REST API and online APP
- **Maximum 100 addresses(\*) per each route / request**
- **Maximum 50 requests per MINUTE**
- **You own the commercial copyright with NO additional fee.**
- **Maximum 3000 input addresses(\*) per MONTH (same requested addresses will be counted also)**
- Get Optimized Route for input addresses
- Get Geocoding(\*\*) data (latitude and longitude) for each address
- Get Distance [m] between each segment's origin and destination of the optimized route
- Get Average Time [seconds] between each segment's origin and destination of the optimized route
- Get Real Time In Traffic Conditions [seconds] (where available) at the moment you make the request between each segment's origin and destination of the optimized route
- Get Tolls for each segment of the optimized route (where available)
- Get Total Distance (km or mi) of the optimized route
- Get Total Average Time (hh:mm) of the optimized route
- Get Total Time In Real Traffic Conditions (hh:mm) of the optimized route
- For Fleet Vehicles Routing you may make requests for each vehicle, so each vehicle will get its optimized route

Administration console

Support through online chat and/or tickets

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90 USD - Buy Now!

## Yearly TIER (15% Discount)

- 918 USD per year
- Use our cloud REST API and online APP
- Maximum 100 addresses(\*) per each route / request
- Maximum 50 requests per MINUTE
- You own the commercial copyright with NO additional fee.
- Maximum 3000 input addresses(\*) per MONTH (same requested addresses will be counted also)
- Get Optimized Route for input addresses
- Get Geocoding(\*\*) data (latitude and longitude) for each address
- Get Distance [m] between each segment's origin and destination of the optimized route
- Get Average Time [seconds] between each segment's origin and destination of the optimized route
- Get Real Time In Traffic Conditions [seconds] (where available) at the moment you make the request between each segment's origin and destination of the optimized route
- Get Tolls for each segment of the optimized route (where available)
- Get Total Distance (km or mi) of the optimized route
- Get Total Average Time (hh:mm) of the optimized route
- Get Total Time In Real Traffic Conditions (hh:mm) of the optimized route
- For Fleet Vehicles Routing you may make requests for each vehicle, so each vehicle will get its optimized route
- Administration console
- Support through online chat and/or tickets

918 USD - Buy Now!

### Notes:

VAT rate may be added or not, function to your country and/or if you are a taxable person or company.

\* Address - may be an exact address (**recommended**), a street address without number, a city, even a country.

\*\* Geocoding - if for one or more input addresses the API cannot geocode it, meaning the API cannot get the latitude and the longitude, then the optimized route will not be calculated and will not be charged. If all the input addresses will be geocoded, then the optimized route segments of the optimized route cannot be done (for ex

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between origin and destination) then the optimized route cannot be calculated and you will be charged.



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