



# Geo API

Version 1.0.6

Confidential

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## Change Request Reference

Change Request (CR) Number(s):	
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## Document Summary

Document Title:	CMT – Geo API
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## Document Change History

Date of Change	Version	Reason for Change	Summary of Change	Build #	Author
July 6, 2015	1.0.0		Initial version	1.0.0	S. Selikoff
July 9, 2015	1.0.1		Added ETA Resource	1.0.1	S. Selikoff
July 20, 2015	1.0.2		Changed oid from int to String	1.0.2	S. Selikoff
July 23, 2015	1.0.3		Added etalnMeters	1.0.3	S. Selikoff
July 30, 2015	1.0.4		Updated documentation	1.0.3	S. Selikoff
August 5, 2015	1.0.5		Added optional parameter for map matching in ETA	1.0.5	S. Selikoff
August 21, 2015	1.0.6		Added fleet id in vehicle record respond	1.0.6	S. Selikoff

## Overview

Creative Mobile Technologies has developed a RESTful API to allow developers to programmatically interface with our geo processing infrastructure.

## Document Usage

This document was designed to be used by developers to wish to integrate with CMT's geo processing infrastructure. A basic understanding of RESTful services, JSON and communications over HTTP are required.

## General Information

### Distances

All distances are in meters unless otherwise specified.

## API Summary

CMT's Geo API is a RESTful service providing developers access to route, map-matching, and vehicle availability information.

## HTTP Response Codes

The following table lists the possible http response codes returned by the CMT Platform API and their corresponding description.

Code	Description
200	Request processed successfully. Check response codes for additional status indicators.
400	Bad request. Includes validation errors, bad JSON.
401	Unauthorized. The response code is returned if: <ul style="list-style-type: none"> <li>- OAuth authentication failure</li> <li>- Session timeout (if session is supported)</li> </ul>
403	Forbidden. Customers will receive this response code if they try to access a method without proper authorization.
500	Server Error. Retry request or contact CMT.

## Authentication Summary

Developers must first obtain an **access\_token** from CMT. All requests to the Geo API must include this access\_token in the header of the request.

### Using the access\_token

Once the app client has been properly authenticated, the access token may be used to access secure consumer resources (account, card on file, etc...). To properly authenticate to secure resources, developers must add the following value to the HTTP header as defined below.

#### HTTP Header

Field	DataType	Size	Required	Notes
Authorization	String	256	Y	Set to "Bearer <access_token>" where <access_token> is a valid accesstoken

Below is a sample with a sample header value.

Authorization: Bearer MWwhMTM3ZjAtOGRiYy00NGQwLWI1OGItZjE4Y2U2MDjklajA

Once a developer is properly authenticated with the API, it will receive a list of security roles. If the user requests access to a resource that it does not access to, a 403 (Forbidden) HTTP status code will be returned.

## Safeguarding Information

In order to ensure the security and safety of cardholder data, CMT strongly suggests storing access\_token. Never share these keys/tokens with anyone.

## A. POST /availability

This resource is designed to display available vehicles for a location given the provided input filters and options.

### Availability Resource URLs

Production: <https://geo.cmtapi.com/availability>

Sandbox: <http://geo-sandbox.cmtapi.com/availability>

If the event that the response sub-code is HTTP 400 indicating an error, then only two fields, responseCode and responseMessage, will be returned.

### URL Parameters

Field	DataType	Size	Required	Notes
-------	----------	------	----------	-------

### Request Field Description

Field	Type	Max Len	Required	Notes												
lat	Decimal		X	The latitude of the origin to search from.												
lon	Decimal		X	The longitude of the origin to search from.												
rad	Decimal		X	The radius in meters to limit the search from the origin location												
limit	Integer		X	The number of vehicles to limit the search to. Must be set to 12 or less if includeETA is set to true.												
meterState	Integer			Meter State filter to use: <table><tr><td>0</td><td>For Hire</td></tr><tr><td>1</td><td>Hired</td></tr></table>	0	For Hire	1	Hired								
0	For Hire															
1	Hired															
logonState	Integer			Logon State filter to use: <table><tr><td>0</td><td>Logged off</td></tr><tr><td>1</td><td>Logged on</td></tr></table>	0	Logged off	1	Logged on								
0	Logged off															
1	Logged on															
ehailState	Integer			Ehail State filter to use: <table><tr><td>0</td><td>Not paired</td></tr><tr><td>1</td><td>Paired with RideLinQ</td></tr><tr><td>2</td><td>Paired with Other</td></tr></table>	0	Not paired	1	Paired with RideLinQ	2	Paired with Other						
0	Not paired															
1	Paired with RideLinQ															
2	Paired with Other															
deviceType	Integer			Device Type filter to use: <table><tr><td>0</td><td>Unknown</td></tr><tr><td>1</td><td>Taxi</td></tr><tr><td>2</td><td>Livery</td></tr><tr><td>3</td><td>Black Car</td></tr><tr><td>4</td><td>Mobile App</td></tr><tr><td>5</td><td>Driver App</td></tr></table>	0	Unknown	1	Taxi	2	Livery	3	Black Car	4	Mobile App	5	Driver App
0	Unknown															
1	Taxi															
2	Livery															
3	Black Car															
4	Mobile App															
5	Driver App															
wavState	Integer			Wheel-chair accessibility state filter to use: <table><tr><td>0</td><td>All</td></tr><tr><td>1</td><td>WAV Enabled</td></tr></table>	0	All	1	WAV Enabled								
0	All															
1	WAV Enabled															
availState	Integer			Availability State filter to use: <table><tr><td>0</td><td>Logged Off</td></tr><tr><td>1</td><td>Available</td></tr><tr><td>2</td><td>On Job</td></tr><tr><td>3</td><td>Unavailable</td></tr><tr><td>4</td><td>Meter on</td></tr></table>	0	Logged Off	1	Available	2	On Job	3	Unavailable	4	Meter on		
0	Logged Off															
1	Available															
2	On Job															
3	Unavailable															
4	Meter on															
markets	String[]			List of market segment codes to filter search on												
fleets	Integer[]			List of fleet ids to filter search on												
medallions	String[]			List of medallions to filter search on												
includeMapMatch	Boolean			If set to true, results will be matched to nearest street location. Default is false.												

includeETA

Boolean

If set to true, results will include ETA in seconds from vehicle to origin. Default is false.

**Response Field Description**

Field	Type	Max Len	Required	Notes												
total	Integer		x	Total number of vehicles in results												
vehicles			x	List of vehicle records												
dt	Integer			Device Type filter to use: <table><tr><td>0</td><td>Unknown</td></tr><tr><td>1</td><td>Taxi</td></tr><tr><td>2</td><td>Livery</td></tr><tr><td>3</td><td>Black Car</td></tr><tr><td>4</td><td>Mobile App</td></tr><tr><td>5</td><td>Driver App</td></tr></table>	0	Unknown	1	Taxi	2	Livery	3	Black Car	4	Mobile App	5	Driver App
0	Unknown															
1	Taxi															
2	Livery															
3	Black Car															
4	Mobile App															
5	Driver App															
dn	String			Device name (unique)												
tm	Long			Timestamp of the last vehicle update in epoch millisecond value												
lt	Decimal			Latitude of the vehicle												
lg	Decimal			Longitude of the vehicle												
cc	Decimal			Compass course of vehicle in degrees												
ve	Decimal			Speed over ground of vehicles in knots												
vl	Integer			Wheel-chair accessibility state: <table><tr><td>0</td><td>All</td></tr><tr><td>1</td><td>WAV Enabled</td></tr></table>	0	All	1	WAV Enabled								
0	All															
1	WAV Enabled															
as	Integer			Availability State filter to use: <table><tr><td>0</td><td>Logged Off</td></tr><tr><td>1</td><td>Available</td></tr><tr><td>2</td><td>On Job</td></tr><tr><td>3</td><td>Unavailable</td></tr><tr><td>4</td><td>Meter on</td></tr></table>	0	Logged Off	1	Available	2	On Job	3	Unavailable	4	Meter on		
0	Logged Off															
1	Available															
2	On Job															
3	Unavailable															
4	Meter on															
mk	String			Market segment identifier of vehicle												
fi	Integer			Fleet or Operator Id of vehicle												
md	String			Taxi medallion												
ms	Integer			Meter State filter to use: <table><tr><td>0</td><td>For Hire</td></tr><tr><td>1</td><td>Hired</td></tr></table>	0	For Hire	1	Hired								
0	For Hire															
1	Hired															
ls	Integer			Logon State filter to use: <table><tr><td>0</td><td>Logged off</td></tr><tr><td>1</td><td>Logged on</td></tr></table>	0	Logged off	1	Logged on								
0	Logged off															
1	Logged on															
es	Integer			Ehail State filter to use: <table><tr><td>0</td><td>Not paired</td></tr><tr><td>1</td><td>Paired with RideLinQ</td></tr><tr><td>2</td><td>Paired with Other</td></tr></table>	0	Not paired	1	Paired with RideLinQ	2	Paired with Other						
0	Not paired															
1	Paired with RideLinQ															
2	Paired with Other															
dr	String			Driver id												
sn	String			Shift number												
tn	Integer			Trip number												
ax	Integer			Action code												
rt	Integer			Rate code												
tt	Integer			Total fare in cents												
ac	Decimal			Horizontal dilution of position												
gv	Integer			GPS validity												
ec	Decimal			Ecio - Signal to noise ratio												
rs	Decimal			RSS - Signal strength												

cq	Integer		Carrier signal quality
db	Integer		Signal DB
sr	Integer		Signal ration
pc	Integer		Passenger count
ave	Decimal		Average velocity
zv	Integer		Zone violation
street	String		Street address
dtm	String		GPS Time hhmmss.SSS (where SSS is milliseconds)
ddt	String		GPS Date in DDMMYY format
pid	String		Pim Id
oid	String		Order id
etaInSeconds	Integer		ETA to location in seconds
etaInMeters	Integer		ETA distance to location in meters
mapMatched	Boolean		True if location was able to be map matched

## Availability Response Codes

### Success Sub-codes (HTTP 200)

Code	Description
------	-------------

### Error Sub-codes (HTTP 400)

Code	Description
441	Missing required input
442	Unexpected Error

## Sample Availability Request (POST):

**URL:** <https://geo.cmtapi.com/availability>

### POST Data Request (JSON)

```
{
  "lat":40.7127,
  "lon":-74.0059,
  "rad":300.0,
  "limit":10,
  "meterState":1,
  "logonState":2,
  "ehailState":0,
  "deviceType":1,
  "wavState":0,
  "availState":1,
  "markets":["NYC","NYSHL"],
  "fleets":[1,2,921,291],
  "medallions":["M12N1","M2129"],
  "includeMapMatch":true,
  "includeETA":true
}
```

*Sample Successful Availability Response (HTTP 200):*

```
{
  "total":2,
```



```

"vehicles":[
  {
    "dt":1,
    "dn":"M2J42",
    "tm":1436215007123,
    "lt":40.512368,
    "lg":-74.004494,
    "cc":332.3,
    "ve":0.0,
    "as":0,
    "mk":"NYC",
    "fi":123,
    "md":"2J42",
    "ms":0,
    "ls":0,
    "es":0,
    "ax":0,
    "ac":0.86,
    "gv":1,
    "dtm":"203645.000",
    "ddt":"060715",
    "etaInSeconds":26,
    "etaInMeters":1873
    "mapMatched":true
  },
  {
    "dt":1,
    "dn":"M7F11",
    "tm":1436215011578,
    "lt":40.752627,
    "lg":-74.003584,
    "cc":263.69,
    "ve":0.17491096,
    "as":4,
    "mk":"NYC",
    "fi":123,
    "md":"7F11",
    "ms":0,
    "ls":1,
    "es":0,
    "dr":"469136",
    "ax":0,
    "ac":1.24,
    "gv":1,
    "dtm":"203650.000",
    "ddt":"060715",
    "etaInSeconds":119,
    "etaInMeters":1873
    "mapMatched":true
  }
]
}

```

*Unsuccessful Availability Response (HTTP 400):*

```

{
  "responseCode":441,
  "responseMessage":"Missing required input: limit"
}

```

## B. POST /eta

This resource is designed to display device and ETA information for a vehicle in transit to a passenger.

### ETA Resource URLs

Production: <https://geo.cmtapi.com/eta>

Sandbox: <http://geo-sandbox.cmtapi.com/eta>

If the event that the response sub-code is HTTP 400 indicating an error, then only two fields, responseCode and responseMessage, will be returned.

### URL Parameters

Field	DataType	Size	Required	Notes
-------	----------	------	----------	-------

### Request Field Description

Field	Type	Max Len	Required	Notes
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
deviceName	String		X	Unique identifier for vehicle in system
includeMapMatch	Boolean			If set to true, results will be matched to nearest street location. Default is false.

### Response Field Description

Field	Type	Max Len	Required	Notes										
dt	Integer			Device Type: <table><tr><td>0</td><td>Unknown</td></tr><tr><td>1</td><td>Taxi</td></tr><tr><td>2</td><td>Livery</td></tr><tr><td>3</td><td>Black Car</td></tr></table>	0	Unknown	1	Taxi	2	Livery	3	Black Car		
0	Unknown													
1	Taxi													
2	Livery													
3	Black Car													
dn	String			Device name (unique)										
tm	Long			Timestamp of the last vehicle update in epoch millisecond value										
lt	Decimal			Latitude of the vehicle										
lg	Decimal			Longitude of the vehicle										
cc	Decimal			Compass course of vehicle in degrees										
ve	Decimal			Speed over ground of vehicles in knots										
vl	Integer			Wheel-chair accessibility state: <table><tr><td>0</td><td>All</td></tr><tr><td>1</td><td>WAV Enabled</td></tr></table>	0	All	1	WAV Enabled						
0	All													
1	WAV Enabled													
as	Integer			Availability State filter to use: <table><tr><td>0</td><td>Logged Off</td></tr><tr><td>1</td><td>Available</td></tr><tr><td>2</td><td>On Job</td></tr><tr><td>3</td><td>Unavailable</td></tr><tr><td>4</td><td>Meter on</td></tr></table>	0	Logged Off	1	Available	2	On Job	3	Unavailable	4	Meter on
0	Logged Off													
1	Available													
2	On Job													
3	Unavailable													
4	Meter on													
mk	String			Market segment identifier of vehicle										
fi	Integer			Fleet or Operator Id of vehicle										
md	String			Taxi medallion										
ms	Integer			Meter State filter to use: <table><tr><td>0</td><td>For Hire</td></tr><tr><td>1</td><td>Hired</td></tr></table>	0	For Hire	1	Hired						
0	For Hire													
1	Hired													
ls	Integer			Logon State filter to use: <table><tr><td>0</td><td>Logged off</td></tr></table>	0	Logged off								
0	Logged off													

				1	Logged on
es	Integer			Ehail State filter to use:	
				0	Not paired
				1	Paired with RideLinQ
				2	Paired with Other
dr	String			Driver id	
sn	String			Shift number	
tn	Integer			Trip number	
ax	Integer			Action code	
rt	Integer			Rate code	
tt	Integer			Total fare in cents	
ac	Decimal			Horizontal dilution of position	
gv	Integer			GPS validity	
ec	Decimal			Ecio - Signal to noise ratio	
rs	Decimal			RSS - Signal strength	
cq	Integer			Carrier signal quality	
db	Integer			Signal DB	
sr	Integer			Signal ration	
pc	Integer			Passenger count	
ave	Decimal			Average velocity	
zv	Integer			Zone violation	
street	String			Street address	
dtm	String			GPS Time hhmmss.SSS (where SSS is milliseconds)	
ddt	String			GPS Date in DDMMYY format	
pid	String			Pim Id	
oid	String			Order id	
etaInSeconds	Integer			ETA to location in seconds	
etaInMeters	Integer			ETA distance to location in meters	
mapMatched	Boolean			True if location was able to be map matched	

## ETA Response Codes

### Success Sub-codes (HTTP 200)

Code	Description
------	-------------

### Error Sub-codes (HTTP 400)

Code	Description
441	Missing required input
442	Unexpected Error

## Sample ETA Request (POST):

**URL:** <https://geo.cmtapi.com/eta>

### POST Data Request (JSON)

```
{
  "deviceName": "M1H66",
  "lat": 40.7127,
```

```
"lon":-74.0059
"includeMapMatch":true
}
```

*Sample Successful ETA Response (HTTP 200):*

```
{
  "dt":1,
  "dn":"M1H66",
  "tm":1436473810117,
  "lt":40.612345,
  "lg":-74.00885,
  "cc":277.93,
  "ve":1.43529876,
  "as":1,
  "mk":"NYC",
  "fi":123,
  "md":"6H66",
  "ms":0,
  "ls":1,
  "es":0,
  "dr":"5177539",
  "ax":0,
  "ac":2.04,
  "gv":1,
  "dtm":"203005.000",
  "ddt":"090715",
  "etaInSeconds":105,
  "etaInMeters":1873
  "mapMatched":true
}
```

*Unsuccessful ETA Response (HTTP 400):*

```
{
  "responseCode":441,
  "responseMessage":"Missing required input: lat,lon"
}
```

## C. POST /match

This resource is used to find nearest lat/lon for a road, given a single position on the map.

### Match Resource URLs

Production: <https://geo.cmtapi.com/match>

Sandbox: <http://geo-sandbox.cmtapi.com/match>

If the event that the response sub-code is HTTP 400 indicating an error, then only two fields, responseCode and responseMessage, will be returned.

### URL Parameters

Field	DataType	Size	Required	Notes
-------	----------	------	----------	-------

### Request Field Description

Field	Type	Max Len	Required	Notes
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long		X	The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Response Field Description

Field	Type	Max Len	Required	Notes
latMatched	Decimal			The map matched lat value if a match can be found
lonMatched	Decimal			The map latched lon value if a match can be found
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long			The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Match Response Codes

#### Success Sub-codes (HTTP 200)

Code	Description
------	-------------

#### Error Sub-codes (HTTP 400)

Code	Description
441	Missing required input
442	Unexpected Error

### Sample Match Request (POST):

**URL:** <https://geo.cmtapi.com/match>

### POST Data Request (JSON)

```
{
  "tm":1436216781767,
  "lat":40.7127,
  "lon":-74.0059,
  "bearing":20.0,
  "speed":15.0
}
```

*Sample Successful Match Response (HTTP 200):*

```
{
  "latMatched":40.712124,
  "lonMatched":-74.005692,
  "tm":1436216781767,
  "lat":40.7127,
  "lon":-74.0059,
  "bearing":20.0,
  "speed":15.0
}
```

*Unsuccessful Match Response (HTTP 400):*

```
{
  "responseCode":441,
  "responseMessage":"Missing required input: lat,lon"
}
```

## D. POST /match/path

This resource is used to find nearest lat/lon for a road, given a set of positions.

### Match Path Resource URLs

Production: <https://geo.cmtapi.com/match/path>

Sandbox: <http://geo-sandbox.cmtapi.com/match/path>

If the event that the response sub-code is HTTP 400 indicating an error, then only two fields, responseCode and responseMessage, will be returned.

### URL Parameters

Field	DataType	Size	Required	Notes
-------	----------	------	----------	-------

### Request Field Description

Field	Type	Max Len	Required	Notes
List of:				
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long		X	The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Response Field Description

Field	Type	Max Len	Required	Notes
List of:				
latMatched	Decimal			The map matched lat value if a match can be found
lonMatched	Decimal			The map latched lon value if a match can be found
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long		X	The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Match Path Response Codes

#### Success Sub-codes (HTTP 200)

Code	Description
------	-------------

#### Error Sub-codes (HTTP 400)

Code	Description
441	Missing required input
442	Unexpected Error

### Sample Match Path Request (POST):

**URL:** *<https://geo.cmtapi.com/match/path>*

**POST Data Request (JSON)**

```
[
  {
    "tm":1436218551020,
    "lat":40.7613,
    "lon":-73.97223,
    "bearing":20.0,
    "speed":15.0
  },
  {
    "tm":1436218561020,
    "lat":40.76237,
    "lon":-73.97073,
    "bearing":20.0,
    "speed":15.0
  }
]
```

*Sample Successful Match Path Response (HTTP 200):*

```
[
  {
    "tm":1436218551020,
    "lat":40.7613,
    "lon":-73.97223,
    "latMatched":40.761345,
    "lonMatched":-73.972191,
    "bearing":20.0,
    "speed":15.0
  },
  {
    "tm":1436218561020,
    "lat":40.76237,
    "lon":-73.97073,
    "latMatched":40.762154,
    "lonMatched":-73.970215,
    "bearing":20.0,
    "speed":15.0
  }
]
```

*Unsuccessful Match Path Response (HTTP 400):*

```
{
  "responseCode":441,
  "responseMessage":"Missing required input: lat,lon"
}
```



## E. POST /match/path/last

This resource is used to find nearest lat/lon for a road, given a set of positions. Convenience version of /match/path were only the last location is returned.

### Match Resource URLs

Production: <https://geo.cmtapi.com/match/path/last>

Sandbox: <http://geo-sandbox.cmtapi.com/match/path/last>

If the event that the response sub-code is HTTP 400 indicating an error, then only two fields, responseCode and responseMessage, will be returned.

### URL Parameters

Field	DataType	Size	Required	Notes
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### Request Field Description

Field	Type	Max Len	Required	Notes
List of:				
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long		X	The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Response Field Description

Field	Type	Max Len	Required	Notes
latMatched	Decimal			The map matched lat value if a match can be found
lonMatched	Decimal			The map latched lon value if a match can be found
lat	Decimal		X	The latitude of the origin to search from.
lon	Decimal		X	The longitude of the origin to search from.
tm	Long			The timestamp the last GPS event occurred in epoch millisecond value
bearing	Decimal			Compass course of vehicle in degrees
speed	Decimal			Speed in meter per second

### Match Response Codes

#### Success Sub-codes (HTTP 200)

Code	Description
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#### Error Sub-codes (HTTP 400)

Code	Description
441	Missing required input
442	Unexpected Error

### Sample Match Request (POST):

**URL:** *<https://geo.cmtapi.com/match/path/last>*

**POST Data Request (JSON)**

```
[
  {
    "tm":1436218551020,
    "lat":40.7613,
    "lon":-73.97223,
    "bearing":20.0,
    "speed":15.0
  },
  {
    "tm":1436218561020,
    "lat":40.76237,
    "lon":-73.97073,
    "bearing":20.0,
    "speed":15.0
  }
]
```

*Sample Successful Match Path Last Response (HTTP 200):*

```
{
  "tm":1436218840364,
  "lat":40.76237,
  "lon":-73.97073,
  "latMatched":40.762154,
  "lonMatched":-73.970215,
  "bearing":20.0,
  "speed":15.0
}
```

*Unsuccessful Match Path Last Response (HTTP 400):*

```
{
  "responseCode":441,
  "responseMessage":"Missing required input: lat,lon"
}
```