

IoT 101 API Guide

Revision E

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Table of Contents

Overview.....	3
Status and error codes	4
Credentials	4
Maintaining a session.....	4
Rate Limits	5
Encoding & data format.....	5
Range and limiting number of records	5
Filtering GET Results	5
Available Resources.....	7
GET /api/v1/device	7
GET /api/v1/device/{id}.....	9
GET /api/v1/device/{id}/journey	9
GET /api/v1/device/{id}/journey/{start_time}	10
GET /api/v1/device/{id}/data/{data_id}?start={s_date}&end={e_date}.....	10
GET /api/v1/device/{device_id}/remoteconfig	10
GET /api/v1/ device/{device_id}/remoteconfig /{id}.....	11
PUT /api/v1/ device/{device_id}/remoteconfig /{id}.....	11
GET /api/v1/group.....	12
GET /api/v1/group/{id}	12
GET /api/v1/user.....	12
GET /api/v1/user/{id}.....	13
Lookup tables and enumerations	14
Device setup keys, live data and report variables	14
Report variables for a specific device type	14
Device input setup values.....	16
Device Types	16
Maps	17
User Permission Levels	17
Device Meta Keys.....	18

Overview

The API conforms to REST standards as found on <https://www.tmforum.org/open-apis/>. It is only available over https (port 443) and is normally stateless. Each request must be authenticated individually using HTTP Basic Authentication, unless cookies are used to maintain a state.

The request takes the format <https://www.emcom.eu/api/v1/{RESOURCE}>.

All responses are UTF-8 encoded JSON.

Status and error codes

HTTP status codes conform to standards. Highlighted below are a few of the main status codes relevant to this API.

- Status 200: OK
- Status 204: No content
- Error 400 : Bad Request
- Error 401 : Not authorised. Either the user/password is not included, or it is incorrect.
- Error 404 : Invalid resource requested.
- Error 405 : Method not allowed.
- Error 429 : Too many requests. The user has hit the rate limit of 10 requests/second.

Credentials

A valid username and password must be created through the web portal before using the API. The user will only be able to access those devices which they also have access to through the web portal.

All requests to the API must be accompanied with HTTP Basic Authentication or a valid session cookie, otherwise the user will receive a http error 401.

```
authorization: Basic YXBpLnRlc3Q6cGFzc3dvcmRoZXJl
```

Maintaining a session

The user is not required to accept cookies, but if cookies are accepted when the user presents a valid username and password, then subsequent requests without the “authorisation” header will be successful for the lifetime of the cookie. To destroy the session on the server (i.e. sign out), present the cookie with blank (or invalid) “authorisation” header.

To login, send the username and password as normal:

```
authorization: Basic YXBpLnRlc3Q6cGFzc3dvcmRoZXJl
```

A standard “Set-Cookie” response header will be received:

```
Set-Cookie: PHPSESSID=976fo2fvhi7cjh7u4tsgjlam1; path=/  
Subsequent requests to the API can remove the “authorisation” by using the cookie header:
```

```
cookie: PHPSESSID=976fo2fvhi7cjh7u4tsgjlam1
```

To sign out, provide a blank authorisation:

```
authorization: Basic Og==
```

Rate Limits

The default rate limit is 5 request/second/user. Outside of this limit, the user will receive a http error 429 “Too Many Requests”. Some queries may have different rates limits.

Encoding & data format

Data is sent using well-formed UTF-8 encoded JSON. Some of the examples within this manual are formatted for readability, but output from the API may not have line breaks and indents.

Where a list of resources is returned, the items will be a JSON array of objects: i.e. within square brackets:

```
[{"id": "1", ...}, {"id": "2", ...}, {"id": "3", ...}]
```

Where a single resource is returned, the items will be a JSON object: i.e. without the square brackets:

```
{"id": "1", ...}
```

Range and limiting number of records

By default, upto 50 resources are returned from an API call. The total number of resources, and current range is provided in the “Content-Range” http header:

```
Content-Range: items 1-50/234
```

If the total number of resources is too computationally expensive, the total number may not be calculated and replaced with *. Range items start counting at 1.

To retrieve later records, use the Range request header

```
Range: items 51-100
```

Filtering GET Results

Results may be filtered by using the query string parameters. The following operators are supported for numeric and string data. Unless specified otherwise, dates are in integer format as a UNIX timestamp.

- {attributeName}.exact – same as if no operator is provided

- {attributeName}.gte – greater than or equal to
- {attributeName}.gt – greater than
- {attributeName}.lte – less than or equal to
- {attributeName}.lt – less than
- {attributeName}.contains – if a string contains item

Examples:

```
/api/v1/device?name=Test  
/api/v1/device?id.gte=450  
/api/v1/device?name.contains=Test
```

Available Resources

GET /api/v1/device

Returns a list of the all the devices which the current user has access to, their basic information and latest status information. The field “live” contains the live data for each device. The numeric identifiers for the live data are described later in this document. Note that as the live data comes from the device, it is not strongly typed and not all data may be present. Some of the attributes are not available to lower access levels.

Attribute Name	Type	Editable	Notes
id	int32	No	auto-increment. Read-only
href	String (MAX)	No	read-only
imei	String (45)	On Creation	read-only once created. Must be unique and cannot be blank
name	String (45)	Yes	
folder	String (100)	Yes	
type_id	int32	On Creation	see "deviceTypes"
map_id	int32	Yes	see "maps"
input_setup	object	Yes	see "inputs"
phone_number	String (45)	Yes	
static_location	int32	Yes	if the device is fixed to a location. 0 for a normal device
icon_id	int64	Yes	Numeric identifier for the icon. See "icons"
driver_id	int32	Yes	user id of the current driver. Negative is for a sub-identity
notes	String	Yes	Free text notepad.
meta	object	Partial	Array of additional information. Different access levels have access to different fields.
group_id	int32	On Creation	Can only be set on object creation

Example of returned JSON:

```
[{
  "id" : "1234",
  "href" : "/api/v1/device/1234",
  "journeys": "/api/v1/device/1234/journey",
  "data": "/api/v1/device/1234/data",
  "imei" : "3591123412345",
  "name" : "Test-Device-306i",
  "folder" : "",
  "type_id" : "446",
  "map" : "1300",
```

```



```



```

    130 : 42,
    131 : "24024",
    136 : 1563000,
    138 : 15,
    160 : "",
    170 : 0
  }
}]

```

GET /api/v1/device/{id}

Returns a single resource as requested, in the same format as /api/v1/device. If the resource does not exist within the users' access level, then an empty list will be returned.

The {id} is an immutable, unique numeric identifier for each device. To request the details of a device by imei, use filtering such as:

```
GET /api/v1/device/?imei=3591123412345
```

Note that the imei must be unique in the system, but in some circumstances the imei can be changed.

To request the details of a device by name, use a filtering such as:

```
GET /api/v1/device/?name=123456789
```

Note however, that uniqueness by name is not enforced by the system. Therefore this request may return more than 1 device.

GET /api/v1/device/{id}/journey

Returns a list of the all the journeys for this device.

```

[ {
  "id" : "1234-1493369456",
  "device_id" : "1234",
  "start_time" : "1493369456",
  "href" : "/api/v1/device/1234/journey/1493369456",
  "end_time" : "1493369908",
  "driver_id": "0",
  "distance": "1.1",
  "duration": "264",
  "max_speed": "51.0",
  "private": "1",
  "start_address": "123 Street name, City, Country",
  "end_address": "123 Another Street, City, Country",
  "end_mileage": "6072.6",
  "start_location": null,
  "end_location": null,
} ]

```

```

    "start_latitude": "51.12345",
    "start_longitude": "-1.34567",
    "end_latitude": "51.23456",
    "end_longitude": "-1.23456"
  ]
}
```

GET /api/v1/device/{id}/journey/{start_time}

Returns a single journey as requested, in the same format as /api/v1/device{id}/journey/. It also includes additional data of the specific locations which make up that journey, and the column headings.

```

{
  ... data the same as journey list ...
  "columns" :
  "utctime,latitude,longitude,speed_kmh,satellites,hdop,time_spent",
  "points" : [
    [1493369456, 51.12345, -1.34567, 10, 14, 0, 0],
    [1493369908, 51.23456, -1.23456, 0, 15, 0, 0]
  ]
}
```

GET /api/v1/device/{id}/data/{data_id}?start={s_date}&end={e_date}

Returns a list of the historical data for this device with a certain data_id between two specified dates. The maximum time period is 2 weeks, and if not specified this will return the data for the previous 1 day. Date format is in unix epoch time UTC. The maximum number of records returned by this will be 10,000. This is only applicable for {data_id} greater than or equal to 100, and below 100 is position data and stored as journeys. To view historical {data_id} less than 100, see the journey method.

```

{
  "href":
  "/api/v1/device/1234/data/111?start=1496185371&end=1496271771",
  "columns": "utctime,value",
  "data": [
    ["1496185802", "12.15"],
    ["1496186402", "12.16"],
    ["1496187002", "12.15"]
  ]
}
```

GET /api/v1/device/{device_id}/remoteconfig

Returns a list of the all the remote configuration relating to the specified device.

```

[
  {
    "id" : "1124",
    "options" : {
      "GPS_STATUS" : {
        "default" : "1",
        "array" : {
          0 : "Off",
          1 : "On"
        }
        "current" : "0",
      }
    },
    "title" : "GPS Status",
    "href" : "/api/v1/device/1234/remotefconfig/1124"
  }
]

```

There can be many options for a single command, and each item will have a default and either an array of possible values, numerical details or a regex which must be adhered to. The default is the site-wide generic value, which may not be the device setting. If there is a property “current” then this is the last known setting. If “current” is missing, then the server is does not know the current value.

GET /api/v1/ device/{device_id}/remotefconfig /{id}

Returns a single resource as requested, in the same format as /api/v1/device/{device_id}/remotefconfig.

PUT /api/v1/ device/{device_id}/remotefconfig /{id}

Changes a remote configuration value via SMS. If “options” is missing or incorrect, or an invalid value is specified, there will be an Error 400. If successful, the response will Status 200 with the corresponding GET, with the value “current” changed.

```

{
  "options" : {
    "GPS_STATUS" : {
      "current" : 1
    }
  }
}

```

Remote configuration commands result in an SMS being sent. Therefore these are rate-limited per device to one PUT each 10 seconds.

```

HTTP/1.1 429 Too many requests
{"error": "Configuration commands are rate limited. Please try again in 8 seconds"}

```

GET /api/v1/group

Returns a list of the all the groups which the current user has access to.

```
[{
  "id" : "3",
  "href" : "/api/v1/group/3",
  "users": "/api/v1/user/?group_id=3",
  "devices": "/api/v1/device/?group_id=3",
  "group_name" : "Test Group",
  "super_group" : ""
}, {
  "id" : "4",
  "href" : "/api/v1/group/4",
  "users": "/api/v1/user/?group_id=4",
  "devices": "/api/v1/device/?group_id=4",
  "group_name" : "Demo Group",
  "super_group" : "Main"
}]
```

GET /api/v1/group/{id}

Returns a single resource as requested, in the same format as /api/v1/group.

GET /api/v1/user

Returns a list of the all the users which the current user can see.

```
[{
  "id" : "1234",
  "href" : "/api/v1/user/1234",
  "user_name" : "api.demo",
  "real_name" : "API Demo Account",
  "email" : "info@example.com",
  "phone_number" : "",
  "fax_number" : "",
  "max_user_level": "4",
  "groups": [
    {
      "id": "3",
      "href": "/api/v1/group/3"
      "user_level": "2"
    }
  ],
}]
```

To view all the users in a particular group, use the filtering such as:

```
GET /api/v1/user/?group_id={group_id}
```

To view all users with a certain level, use the filtering such as:

```
GET /api/v1/user/?max_user_level=8
```

or greater than or equal to a certain level,

```
GET /api/v1/user/?max_user_level.gte=8
```

GET /api/v1/user/{id}

Returns a single resource as requested, in the same format as /api/v1/user.

Lookup tables and enumerations

Device setup keys, live data and report variables

A full list is available through the API as GET /api/v1/lookup/report_variables , below is a portion of that which is common to all devices:

ID	Name	Description
0	Server Time	Server timestamp at last contact in UNIX format in UTC. May be 0 if no data has been received.
1	Device Time	Device timestamp for position in UNIX format in UTC. Will be 0 if not data has been received.
2	Latitude	Decimal degrees
3	Longitude	Decimal degrees
4	Speed	Speed in km/h
5	Bearing	Bearing in degrees
6	Number of satellites	Number of satellites in view
10	Battery level	In percentage
14	HDOP	From GPS

Report variables for a specific device type

A full list of the available inputs for a device type is available through the API as /api/v1/lookup/report_variables?type={device_type}. This listing does not include the position data (id < 100) which is common to all devices (see table above).

E.g. this is from /api/v1/lookup/report_variables?type=447

id	name	description	input_id	name	units
100	Running	When the tracker is running or not. This is used for journey reports	1020	Supply voltage above 13.2V	
			1056	Tamper Wire (10m auto stop)	
			1055	Tamper Wire	
			1051	Tracker Ignition (10m auto stop)	
			1050	Tracker Ignition	
			1049	Custom Running Voltage	
			1031	Supply voltage above 26.8V	
			1030	Supply voltage above 26.4V	
			1021	Supply voltage above 13.6V	
			1012	Sticky-stop algorithm (Medium wander)	
			1010	Sticky-stop algorithm (Low wander)	
101	Journey auto stop	Automatically stop the journey after no contact	1090	10 minute auto stop	
			1000	None	

102	Combine Journeys	Combine journeys with very short stops	1082	when stop is less than 3 minutes	
			1083	when stop is less than 4 minutes	
			1080	when stop is less than 1 minute	
			1000	None	
			1084	when stop is less than 5 minutes	
			1081	when stop is less than 2 minutes	
110	Battery Voltage	The internal battery voltage	1100	Internal battery voltage, %	%
115	Charging	If the tracker is currently charging	1000	None	
			1185	Charging	
130	GSM signal strength	Current GSM signal strength	1300	GSM signal strength	%
131	Network operator	Current phone network operator	1000	None	
			1310	Network Operator	
136	Odometer (Server)	Server based odometer	1361	Odometer (km)	km
			1000	None	
			1364	Miles (Server)	mi
			1363	Nautical Miles (Server)	nmi
138	Satellites	Number of satellites	1000	None	
			1380	Satellites	
155	Report Cause	ID of the reason for the unit sending data	1000	None	
			1550	SRT Report Cause	
175	Sleep Mode		1750	Sleep Mode	
			1000	None	
190	Current Profile	Current Profile	1900	Profile	
			1000	None	
200	Temperature A		1000	None	
			2050	Temperature, °C	°
220	Humidity A		2100	Relative Humidity, %	%
			1000	None	
400	Digital Input A		4001	IR Sensor	
			1000	None	
401	Digital Input B		4115	Vibration Alarm	
			1000	None	
402	Digital Input C		1000	None	
			4120	Temperature Alarm	
405	Digital Input F		4005	Input 1	
			1000	None	
			4061	Press Button 2	
			4071	Toggle Button 2	
406	Digital Input G		1000	None	

			4062	Press Button 3	
			4006	Input 2	
			4072	Toggle Button 3	
407	Digital Input H		4007	Output 1	
			4073	Toggle Button 4	
			4063	Press Button 4	
			1000	None	
445	Journey Tag		1000	None	
			4450	Private/Business Journeys	
446	Configuration Change		4133	Configuration Change Alarm	
			1000	None	
448	SIM Card Change		1000	None	
			4132	SIM Card Change Alarm	
800	GPS Fix Age	Age of the GPS fix in seconds	1000	None	
			8000	Enabled (minutes)	minutes

Device input setup values

A full list is available through the API as GET /api/v1/lookup/device_input

Device Types

This is available through the API as GET /api/v1/lookup/device_types

id	TypeName	TypeDesc
1	Vehicle	Tiso 19
2	Vehicle	Tiso 2
10	Vehicle	AVL-900
20	Vehicle	Teltonika FM1010/1122/4200/5300
30	Vehicle	UDRIVE-PRO01
32	Vehicle	UDRIVE Motorcycle Device
40	Vehicle	Portman MT1050
41	Vehicle	Portman GT3620
44	Vehicle	SRT 278
45	Vehicle	Arknava R35
46	Vehicle	Arknava RX-8
50	Vehicle	ATrack
55	Vehicle	Gosafe
60	Vehicle	Castel
401	Handheld	Teltonika GH1202/3000
410	Handheld	Holux 007

412	Handheld	Holux 005
416	Handheld	Toplovo
430	Handheld	Portman GT2000NP
432	Handheld	Portman GT2200
440	Handheld	Menq P205
441	Handheld	Menq T200
445	Handheld	V-Sun V520/V680
446	Handheld	SRT 306/306i/326/326i/346
450	Handheld	SJA
455	Handheld	Xexun TK102
460	Handheld	TWIG
22	Vehicle	TIG FM-R4 Pro
505	Other	Rion NL-52
65	Vehicle	Amigo
510	Other	Wind Logger
515	Other	SRT Temperature Logger
520	Other	Arduino logger
550	Tablet	Alarm Receiver Tablet
447	Handheld	SRT 347

Maps

This is available through the API as GET /api/v1/lookup/maps

Map ID	Map Name
0	None
1300	google

User Permission Levels

This is available through the API as GET /api/v1/lookup/user_levels

id	name	description
2	User	End user that can just view their tracker
4	Manager	User that can view their groups trackers.
8	Group Manager	They can view and edit their groups users and trackers
10	Group Admin	Can manage all the devices and group properties
16	Admin	Admin is for creating new groups and users

Device Meta Keys

This is available through the API as GET /api/v1/lookup/device_meta

Key	Value	View Level	Edit Level	Help	Array
Vehicle_Registration		8	8	The vehicle registration.	
User_Notes		4	4	Notes editable by the user	
Speed_Range	120	4	8		{"": "None", "15": "0-15", "50": "0-50", "120": "0-120"}
Speed_Limits	30,50,70,90,110	4	8	The default speed limits on the map report	
SMS_Credits	0	4	16	Number of SMS credits this device has left	
SIM_PUK_Code		4	8		
SIM_PIN_Code		4	8		
Show_Map_Trail		4	8	If the history trail is shown on the main tracking map	{"": "None", "15": "15 seconds", "30": "30 seconds", "60": "1 minute", "120": "2 minutes", "180": "3 minutes", "1": "5 minutes"}
Service_Date		4	8	Date of the last service	
Serial_Number		4	8	Serial number of the device	
Running_Voltage	13.4	4	8	The supply voltage at which running is triggered if the algorithm is set to 'Custom'	
Private_Business		4	8		{"": "(Default)None, all journeys are in the same category", "10": "Yes, separate private and business journeys in reports", "20": "Yes, separate and hide private journey addresses in reports"}
MOT_Date		4	8	Date of the last MOT	
Map_Notes		2	4	This information is shown in the device hover box on the main map.	
Journey_Tag_Types		4	8		{"": "None", "16": "Free Text", "12": "Container Number and Vehicle ID", "20": "SRT Text and expiry"}
Journey_Tags		2	4		
Input_4_Calibration		4	8	This links analogue input 4 voltage (in mV) to the desired screen units, such percentage or litres.	
Input_3_Calibration		4	8	This links analogue input 3 voltage (in mV) to the desired screen units, such percentage or litres.	
Input_2_Calibration		4	8	This links analogue input 2 voltage (in mV) to the desired screen units, such percentage or litres.	

Input_1_Calibration		4	8	This links analogue input 1 voltage (in mV) to the desired screen units, such percentage or litres.	
IMSI		4	8	IMSI of the device	
Fuel_Tank_Size	75	4	8	Fuel tank in litres	
Fuel_Price_Source		4	8		
Fuel_Economy_mpg		4	8	Enter the average fuel economy of the vehicle in miles per gallon.	
Fuel_Consumption_L		4	8	Enter the average fuel consumption in litres per 100km	
Fuel_2_Calibration		4	8	This links the fuel tank data to the desired screen units, such percentage or litres.	
Fuel_1_Calibration		4	8	This links the fuel tank data to the desired screen units, such percentage or litres.	
Force_Units	Metric	4	8		{"":"User Defined", "Metric": "Metric", "Imperial": "Imperial", "Nautical": "Nautical"}
Driver_Type		4	8	e.g. 'Driver', 'Handler', 'User'	
Asset_Type		4	8	e.g. 'Device', 'Asset', 'Vehicle'	