TM Forum Specification

API GeographicLocation Conformance Profile

TMF675B

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NOTICE

Direct inquiries to the TM Forum office:

4 Century Drive, Suite 100
Parsippany, NJ 07054, USA
Tel No. +1 973 944 5100
Fax No. +1 973 944 5110
TM Forum Web Page: www.tmforum.org

TABLE OF CONTENTS

INTRODUCTION - API DESCRIPTION

This API encapsulates the majority of Geometry Objects defined by GeoJSON – an open standard format designed for representing simple geographical features – and released by the Internet Engineering Task Force (IETF) as RFC 79462 in August 2016. The GeoJSON schemas are adopted by FIWARE as a basis for describing IoT device (sensor, actuator) locations; supported as a Google Maps data-layer and by Amazon Web Services Location Service.

The GeoJSON types are placed in a hierarchy under a TMForum GeographicLocation super-class (analogous to a GeoJSON Geometry), which is itself a kind-of TMForum Place. GeographicLocation sits alongside TMF673 GeographicAddress and TMF674 GeographicSite. A GeographicLocation might be used to return the location (place) of a PhysicalResource or the position/area where Service is being provided.

RESOURCE MODEL CONFORMANCE

API MANDATORY RESOURCES

The following table indicates the mandatory resources for this API.

Resource Name	Comment
GeographicLocation	Only concrete subclasses (GeoJsonLineString, GeoJsonMultiLineString, GeoJsonMultiPoint, GeoJsonPoint, GeoJsonPolygon) of the abstract GeographicLocation should be passed in a GET and POST operation (which is mandatory).

GENERAL NOTES ON RESOURCE ATTRIBUTE CONFORMANCE

There are three situations that could occur for an attribute:

- Mandatory attribute,
- Mandatory attribute if the optional parent attribute is present,
- Non-mandatory/Optional attribute. Those are all the other attributes not mentioned in the following subsections. Please refer to the corresponding API REST Specification for more details.

- The tables in the subsections below indicate which attributes are mandatory including mandatory when an optional parent is present.
- Where a resource is an input into an API (e.g. POST, PATCH), Mandatory means that the attribute value must be supplied by the API consumer in the input (and must not be blank or null).
- Where a resource is an output from an API (e.g. GET, POST), Mandatory means that the attribute value must be supplied by the API provider in the output (and must not be blank or null).
- For a sub-resource that is not an array, Mandatory (cardinality 1..1) means that the sub-resource must be present, while Optional (cardinality 0..1) means that the sub-resource may be absent. Mandatory and Optional on the sub-resource attributes apply to the sub-resource if present.
- For a sub-resource that is an array, Mandatory (cardinality 1..*) means that at least one sub-resource must be present in the array, while Optional (cardinality 0..*) means that the array may be absent. Mandatory and Optional on the sub-resource attributes apply to each of the sub-resources if present.

In this table are listed all mandatory attributes. A mandatory attribute MUST be retrieved in resource representation when no attribute selection is used (e.g. GET /../{id}) without any attribute selection

When an attribute is listed with an indentation (in second column) it means this attribute is mandatory if root (parent) attribute is present.

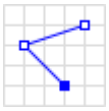
GEOGRAPHICLOCATION RESOURCE MANDATORY ATTRIBUTES

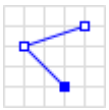
Mandatory attribute when parent is present	Rule
@type	M Being an abstract-base type, you must state the concrete sub-type
href	M (in response messages)
id	M (in response messages)

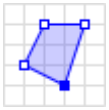
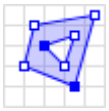
The following details the mandatory attributes of the concrete subclasses, which are in addition to the mandatory attributes in the parent class – GeographicLocation. To implement the complete set of GeoJSON geometric primitives, **all** these subclasses (hence all *their* mandatory attributes) need to be implemented:

GeoJsonPoint: Mandatory attributes.		Rule
Consider the GeoJSON exemplar from the user-guide: Point `{ "@type": "GeoJsonPoint", "geoJson": { "type": "Point", "coordinates": [30, 10] } }`		
@type		M = "`GeoJsonPoint`" This is the concrete subtype from the enumeration: ○ `GeoJsonPoint` ○ `GeoJsonMultiPoint` ○ `GeoJsonLineString` ○ `GeoJsonMultiLineString` ○ `GeoJsonPolygon`
geoJson		M The underlying GeoJSON schema for a `GeoJsonPoint`
	type	M = "`Point`" To state the geometric primitive in GeoJSON terminology.
	coordinates	M *<anonymous number>*

GeoJsonPoint: Mandatory attributes.		Rule
Consider the GeoJSON exemplar from the user-guide: Point `{ "@type": "GeoJsonPoint", "geoJson": { "type": "Point", "coordinates": [30, 10] } }`		
		minItems: 2 maxItems: 3 This is an individual coordinate (x,y) or (lat,lon) If a third number is given, it is interpreted as an altitude (lat,lon,alt)

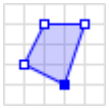
GeoJsonLineString: Mandatory attributes.		Rule
Consider the GeoJSON exemplar from the user-guide: LineString  `{ "@type": "GeoJsonLineString", "geoJson": { "type": "LineString", "coordinates": [ [30, 10], [10, 30], [40, 40] ] } }`		
@type		M = "`GeoJsonLineString`" This is the concrete subtype from the enumeration: ○ `GeoJsonPoint` ○ `GeoJsonMultiPoint` ○ `GeoJsonLineString` ○ `GeoJsonMultiLineString` ○ `GeoJsonPolygon`
geoJson		M The underlying GeoJSON schema for a `GeoJsonLineString`
	type	M = "`LineString`" To state the geometric primitive in GeoJSON terminology.
	coordinates	M

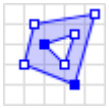
GeoJsonLineString: Mandatory attributes.			Rule
Consider the GeoJSON exemplar from the user-guide: LineString  `{ "@type": "GeoJsonLineString", "geoJson": { "type": "LineString", "coordinates": [ [30, 10], [10, 30], [40, 40] ] } }`			
			minItems: 2 A collection of **two or more** positions
		<anonymous position>	M minItems: 2 maxItems: 3 This is an individual coordinate (x,y) or (lat,lon) If a third number is given, it is interpreted as an altitude (lat,lon,alt)

GeoJsonPolygon: Mandatory attributes.	Rule
Consider the GeoJSON exemplar from the user-guide: Polygon  `{ "@type": "GeoJsonPolygon", "geoJson": { "type": "Polygon", "coordinates": [ [[30, 10], [40, 40], [20, 40], [10, 20], [30, 10]] ] } }`	
 `{ "@type": "GeoJsonPolygon", "geoJson": { "type": "Polygon", "coordinates": [ [[35, 10], [45, 45], [15, 40], [10, 20], [35, 10]], [[20, 30], [35, 35], [30, 20], [20, 30]] ] } }`	
@type	M = "`GeoJsonPolygon`" This is the concrete subtype from the enumeration: ○ `GeoJsonPoint` ○ `GeoJsonMultiPoint`

GeoJsonPolygon: Mandatory attributes.	Rule

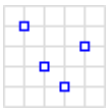
Consider the GeoJSON exemplar from the user-guide:

Polygon
 
	<pre>{
	  “@type”: "GeoJsonPolygon",
	  “geoJson”: {
	  "type": "Polygon",
	  "coordinates": [
	  [[30, 10], [40, 40], [20, 40], [10, 20], [30, 10]]
	  ]
	  }
	}</pre>

	<pre>{
	  "@type": “GeoJsonPolygon”,
	  "geoJson": {
	  "type": "Polygon",
	  "coordinates": [
	  [[35, 10], [45, 45], [15, 40], [10, 20], [35, 10]],
	  [[20, 30], [35, 35], [30, 20], [20, 30]]
	  ]
	}</pre>

				○ `GeoJsonLineString` ○ `GeoJsonMultiLineString` ○ `GeoJsonPolygon`
geoJson				M The underlying GeoJSON schema for a `GeoJsonPolygon`
	type			M = “`Polygon`” To state the geometric primitive in GeoJSON terminology.
	coordinates			M minItems: 2 A collection of linear rings
		<anonymous collection>		A collection of at least four positions minItems: 4
			<anonymous *position*>	M minItems: 2 maxItems: 3 This is an individual coordinate (x,y) or (lat,lon) If a third number is given, it is interpreted as an altitude (lat,lon,alt)

GeoJsonMultiPoint: Mandatory attributes.			Rule

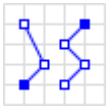
Consider the GeoJSON exemplar from the user-guide:
MultiPoint
 
`{`
`“@type”: "GeoJsonMultiPoint",`
`“geoJson”: {`
`"type": "MultiPoint",`
`"coordinates": [`
`[10, 40], [40, 30], [20, 20], [30, 10]`
`]`
`}`
`}`			

@type			M = “`GeoJsonMultiPoint`” This is the concrete subtype from the enumeration: ○ `GeoJsonPoint` ○ `GeoJsonMultiPoint` ○ `GeoJsonLineString` ○ `GeoJsonMultiLineString` ○ `GeoJsonPolygon`
geoJson			M The underlying GeoJSON schema for a `GeoJsonPolygon`
	type		M = “`MultiPoint`” To state the geometric primitive in GeoJSON terminology.
	coordinates		M A collection of positions
		<anonymous *position*>	M minItems: 2 maxItems: 3 This is an individual coordinate (x,y) or (lat,lon) If a third number is given, it is interpreted as an altitude (lat,lon,alt)

GeoJsonMultiLineString: Mandatory attributes.	Rule

Consider the GeoJSON exemplar from the user-guide:

MultiLineString	

	{
	“@type”: "GeoJsonMultiLineString",
	“geoJson”: {
	"type": "MultiLineString",
	"coordinates": [
	[[10, 10], [20, 20], [10, 40]],
	[[40, 40], [30, 30], [40, 20], [30, 10]]
	]
	}
	}

@type				M = “`GeoJsonMultiLineString`” This is the concrete subtype from the enumeration: ○ `GeoJsonPoint` ○ `GeoJsonMultiPoint` ○ `GeoJsonLineString` ○ `GeoJsonMultiLineString` ○ `GeoJsonPolygon`
geoJson				M The underlying GeoJSON schema for a `GeoJsonMultiLineString`
	type			M = “`MultiLineString`” To state the geometric primitive in GeoJSON terminology.
	coordinates			M minItems: 2 A collection of line strings
		<anonymous collection>		A collection of at least two positions minItems: 2
			<anonymous *position*>	M minItems: 2 maxItems: 3 This is an individual coordinate (x,y) or (lat,lon) If a third number is given, it is interpreted as an altitude (lat,lon,alt)

API OPERATIONS CONFORMANCE

For every single resource the following tables includes mandatory operations.

GEOGRAPHICLOCATION MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the GeographicLocation resource:

Uniform API Operation
GET
POST

API GET OPERATION CONFORMANCE

All the GET operations in this API share the same status code pattern.

GET	Mandatory/Optional
Response Status Code 200 if successful	M
Response Status Code 404 if not found	M

DEFINITIONS FOR FILTER

The following definitions apply to all the GET operations:

- Filtered Search: A filtered search can be applied using query parameters to obtain only the resources that meet the criteria defined by the filtering parameters included in the query request. Several elements can be applied to the filtered search. In that case logic, a logical AND is applied to combine the criteria (e.g.:?severity=<value>&status=<value>).
- Attribute selection (Limiting Response Data): In order to limit which attributes are included in the response, the GET request can include the ?fields= query parameter. Only those attributes whose names are supplied in this parameter will be returned. Attribute selection capabilities are the same for collections retrieval and individual resource queries.
- Level: The filtering and attribute selection can apply to the top level properties (attributes) and subproperties. The tables below show which attributes need to be supported in top-level or contained resources.

GET /GEOGRAPHICLOCATION?FIELDS=...&{FILTERING}

This operation list or find GeographicLocation entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /GEOGRAPHICLOCATION/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a GeographicLocation entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

API POST OPERATION CONFORMANCE

All the POST operations in this API share the same status code pattern.

POST	Mandatory/Optional
Status Code 201 if resource created	M

POST /GEOGRAPHICLOCATION

This operation creates a GeographicLocation entity.

The following table provides the list of mandatory attributes when creating an instance of the GeographicLocation resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
@type	MUST name the concrete sub-type
geoJson	MUST always be present, but the body will vary depending on the concrete sub-type used

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Release Number	Date	Release led by:	Description
19.5	January 2022	Stephen Harrop Vodafone Group Services Limited	Initial Release

VERSION HISTORY

Version Number	Date	Modified by	Description
1.0	January 2022	Stephen Harrop Vodafone Group Services Limited	Initial Release