

Weight Scale / Body Composition Analyzer APIs

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1. Scope

Body weight is one of the essential vital signs health measurements. Body composition is also important in assessing health.

The GotAPI provides a multi-purpose web-based framework to enable interwork of applications and external devices such as weight scales. The GotAPI consist of the GotAPI Server and the Extension Plug-Ins. A smartphone application communicates with a specified Extension Plug-In through the GotAPI Server using Web technologies.

In the GotAPI framework, Extension Plug-Ins interact with Weight Scales and/or Body Composition Analyzers, and expose interfaces to the GotAPI Server. Thanks to the Extension Plug-Ins, smartphone applications can interact with many kinds of Weight Scales and/or Body Composition Analyzers using the consistent APIs specified in this specification.

This is the technical specification part of the Weight Scale and/or Body Composition Analyzer Device WebAPIs whose requirements and architecture are defined in a separate document [DWAPI-PCH].

2. References

2.1 Normative References

[DWAPI-PCH]	Device WebAPI-PCH OMA-ER-Device_WebAPIs-V1_0-20160419-C URL:http://www.openmobilealliance.org/
[EventSource]	“Server-Sent Events”, Worldwide Web Consortium (W3C), URL:http://dev.w3.org/html5/eventsource/ (latest working draft)
[GotAPI 1.1]	Generic Open Terminal API Framework (GotAPI), Candidate Version 1.1 – 15 Dec 2015 URL:http://www.openmobilealliance.org/
[HTTP/1.1]	“Hypertext Transfer Protocol -- HTTP/1.1”, Internet Engineering Task Force (IETF), URL:http://tools.ietf.org/search/rfc2616
[HTTP/2.0]	“Hypertext Transfer Protocol version 2.0”, Internet Engineering Task Force (IETF), URL:http://tools.ietf.org/search/draft-ietf-httpbis-http2-09 (latest working draft)
[JSON-RPC]	“JSON-RPC 2.0 Specification”, JSON-RPC Working Group, URL:http://www.jsonrpc.org/specification
[RFC2119]	“Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt
[SCRRULES]	“SCR Rules and Procedures”, Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/
[WebSocket]	“The WebSocket API, Worldwide Web Consortium (W3C), URL:http://dev.w3.org/html5/websockets/ (latest working draft)

2.2 Informative References

[OMADICT]	“Dictionary for OMA Specifications”, Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2.9, URL:http://www.openmobilealliance.org/
[OMNA]	“OMA Naming Authority”. Open Mobile Alliance™. URL:http://www.openmobilealliance.org/tech/omna.aspx

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

Agent	A node that collects and transmits personal health data to an associated manager.
API Patterns	Design guidelines and requirements for definition of APIs
Body Composition Analyzer	An agent for measuring the fundamental constituents of the human body that consists of water, protein, mineral, and fat.
Browser Context	Web applications executing under a Web browser as Web runtime environment.
Datagram	An API providing access to UDP protocol based networking.
Device	A physical device implementing either an Agent or manager role.
ECMAScript	Use definition from [OMADICT].
Hybrid Native/Web App	An application designed to execute under the native OS / middleware environment of a device, and that use native APIs for the execution of web content in addition to native code.
JavaScript	Use definition from [OMADICT].
Manager	A node receiving data from one or more agent systems. Examples of managers include a cellular phone, health appliance, set top box, or computer system.
Native App	An application designed to execute under the native OS / middleware environment of a device.
Personal Health Device	A device used in personal health applications.
Socket	An API providing access to TCP protocol based networking.
Uniform Resource Identifier	Use definition from [OMADICT].
User Agent	Use definition from [OMADICT].
Web	The World Wide Web, a content and application framework based upon hypertext and related technologies, e.g. XML, JavaScript/ECMAScript, CSS, etc.
Web Application	An application designed using Web technologies (e.g. HTML, CSS, and Javascript).
Web IDL	An IDL language for Web application APIs
Web Runtime Application	A client-side Web application that is executed in Web runtime environments.
Web Runtime Environment	Client software that supports the execution of Web applications (e.g. browsers or widget engines).
WebSocket	An API providing networking services per the WebSocket standard [WebSocket].
Weight	The force that results from the exertion of gravity on an object. The weight is directly proportional to the mass of the object. However, in the health care domain the term body weight is typically used to denote the body mass of a person. This notation applies also to this standard.
Weight Scale	Devices for measuring weight

Widget Context	Web applications installed and executing under a W3C Widget [W3C-Widgets] engine as Web runtime environment.
Widget Engine	Software which supports the execution of Web applications running outside a browser context, e.g. with the same functional capabilities as browsers but without the user interface functions provided by a browser, including window frames, menus, toolbars and scroll bars.

3.2 Abbreviations

API	Application Programming Interface
EventSource	The EventSource API (Server-Sent Events)
HTTP	HyperText Transfer Protocol
IDL	Interface Definition Language
JSON	JavaScript Object Notation
MIME	Multipurpose Internet Mail Extensions
OMA	Open Mobile Alliance
REST	REpresentational State Transfer
RPC	Remote Procedure Call
SCR	Static Conformance Requirements
TS	Technical Specification
UA	User Agent
UE	User Equipment
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
W3C	World Wide Web Consortium
WRAPI	The OMA Web Runtime API enabler
XML	eXtensible Markup Language
XSD	XML Schema Definition

4. Introduction

This is the technical specification part of the Weight Scale / Body Composition Analyzer Device WebAPIs whose requirements and architecture are defined in a separate document [DWAPI-PCH]. The architectural aspects of these APIs are defined in the AD section of [DWAPI-PCH]. This specification must adhere to the GotAPI 1.1 specification. APIs for Weight Scale and/or Body Composition Analyzer (BCA) Plug-Ins are specified together in this specification.

- Weight Scales supported by the Plug-Ins in this specification are expected to be able to report body mass and optionally body length (height) and body mass index (BMI). The descriptions of the measurements reported by the Weight Scale Plug-Ins follow the IEEE 11073-10415 specialization specification.
- Body Composition Analyzers (BCAs) report body fat, body mass, body length, and may support several other related measurements such as muscle mass, body water, fat free mass, soft lean mass, and BMI as specified in IEEE 11073-10420.

Given the fact that a BCA is essentially a Weight Scale with additional measurements, a BCA will support all the Weight Scale specifications in addition to those that are specific to BCAs. The only exception is that the IEEE BCA (IEEE 11073-10420) mandates body length but it is optional in the IEEE 11073-10415 Weight Scales. Thus if a Plug-In supporting BCAs does not receive a body length measurement from the device that is connected to the Plug-In, then it will not report such a measurement data through the APIs.

Weight Scales and/or BCAs are typically accessed by one-shot messages, where measurement data is transferred from a Weight Scale and/or a BCA to an application in one transaction. Some Weight Scales and/or BCAs are capable of storing data and they may transfer multiple data in a 1-shot message. The number of data stored in Weight Scales and/or BCAs is typically less than 25. However, some Weight Scales and/or BCAs may be able to persistently store data and may transfer a larger number of data than 25.

The descriptions of the measurement of Weight Scales and/or BCAs reported by the Weight Scale and/or BCA Plug-Ins follow the IEEE 11073-10415 Weight Scale specialization specification and the IEEE 11073-10420 Body Composition Analyzer specialization specification, respectively. Nonetheless, this does not mean that Weight Scales and/or BCAs that want to use the APIs must follow the IEEE 11073-10415 and the IEEE 11073-10420 specifications. The Weight Scale and/or BCA WebAPIs specified in this document can be used for Weight Scales and/or BCAs that support IEEE 11073-10415 and IEEE 11073-10420 as well as those that do not support the IEEE 11073-10415 and the IEEE 11073-10420. In the latter case, however, the Weight Scales and/or BCAs must provide to the Plug-Ins the necessary information such that the Plug-Ins can fulfil their reporting requirements as specified in this document.

This document defines Weight Scale / Body Composition Analyzer (BCA) Device WebAPI specifications for

- Service Discovery
- One-short measuring API
- Asynchronous measuring API

The architectural aspects of these APIs are defined in the AD section of [DWAPI-PCH]. This specification must adhere to the GotAPI 1.1 specification.

4.1 Version 1.0

Weight Scale / Body Composition Analyzer Device WebAPIs version 1.0 includes the functionality:

- Device WebAPI specifications for DWAPI-PCH, with device classes from IEEE 11073-10415 Weight Scale and IEEE 11073-10420 Body Composition Analyzer specialization based on the GotAPI 1.1 framework
- Device WebAPIs for Service Discovery, One-short measuring API and asynchronous measuring
- Requirements and architecture documents [DWAPI-PCH]

5. Technical Specifications

This specification must adhere to the GotAPI 1.1 specification. This document specifies certain aspect of GotAPI 1.1 as the basis and introduces new elements that are necessary for Weight Scale/Body Composition Analyzer devices supporting the IEEE 11073-10415 Weight Scale and IEEE 11073-10420 Body Composition Analyzer specializations.

In order to increase readability, the specification described below uses the same tables as defined in GotAPI 1.1, describing the necessary features including those of the general procedures of any GotAPI 1.1 uses as well as those specific to the Weight Scale/Body Composition Analyzer APIs. Those specifications that are specific to the Weight Scale/Body Composition Analyzer APIs are colored in green in the following tables, in order to increase readability, to make identity distinction easily. Those rows that are not colored in green are merely copies from the GotAPI 1.1 specification [GotAPI 1.1].

5.1 The Service Discovery on the GotAPI-4 Interface

Service Discovery API enables applications to discover available services as define in the Section 7.2.1[DWAPI-PCH]. Service Discovery API specification adheres to that of GotAPI 1.1.

Here is the Service Discovery based on what is defined in GotAPI 1.1. After the application obtains authorization for access to GotAPI-based APIs using the GotAPI-2 Interface, the application sends the Service Discovery request to the GotAPI Server. Then the GotAPI Server sends the Service Discovery request to all of the installed Extension Plug-Ins. The message flow of the Service Discovery is shown in Fig. 1.

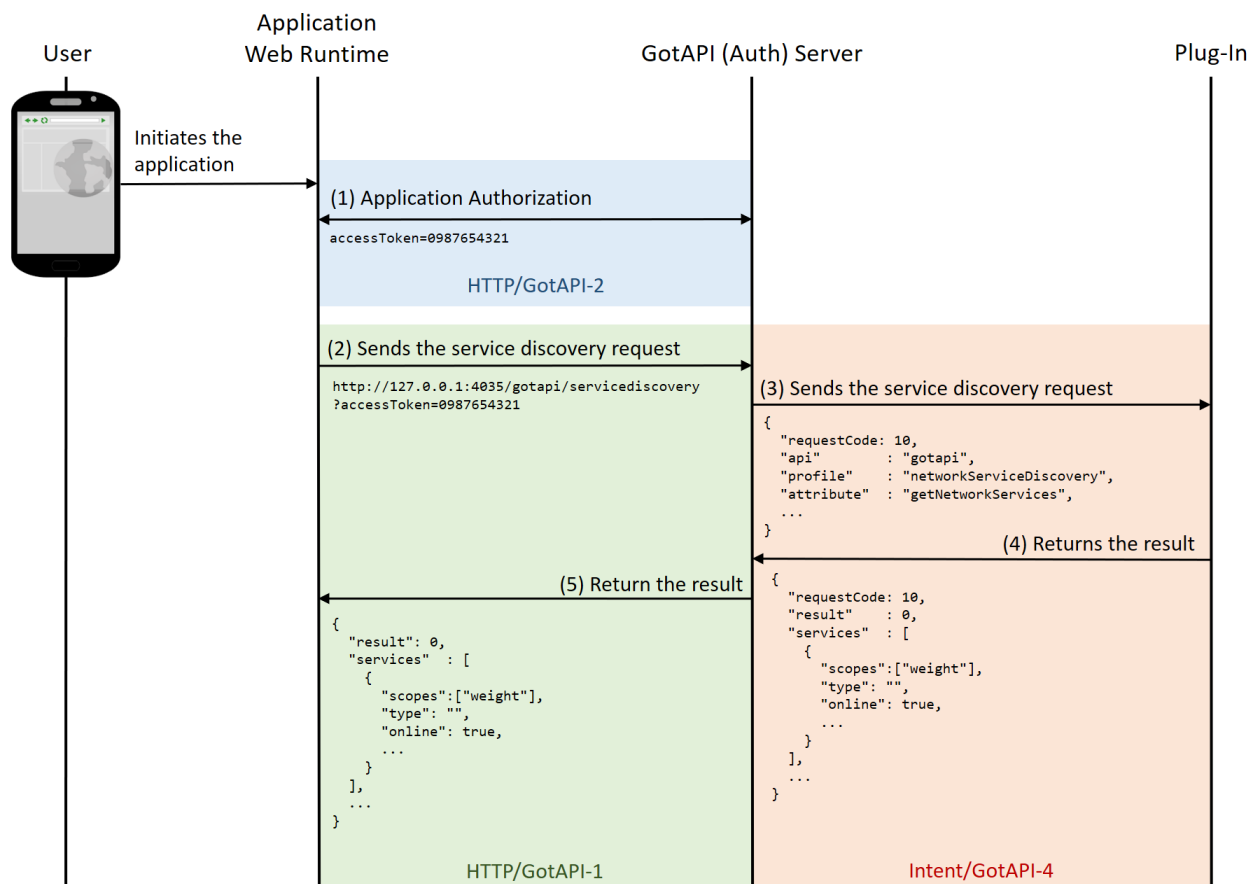


Figure 1: Message flow of the Service Discovery

The specific data in the message flows labelled (4) in the figure above are defined as follows. The other message flows SHALL be consistent to what are defined in the GotAPI 1.1 specification:

When the GotAPI Server receives the request of the Service Discovery API from an application, the GotAPI Server sends the Plug-In discovery request to the installed Plug-Ins as defined in the GotAPI specification. When the Plug-In receives the Plug-In discovery request from the GotAPI Server, the Plug-In SHALL return the message as follows:

Definition of the data object for the Plug-In discovery response

Name	Sub name	Type	Definition of value	Mandatory/Optional
requestCode		int	The request code coming from the GotAPI Server.	Mandatory
result		int	If success, the value is 0, otherwise an integer other than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory
services		Array		Mandatory
	serviceId	String	The service identifier. The id could be "com.example.plugin".	Mandatory
	name	String	The name of the targeted device.	Mandatory
	manufacturer	String	The manufacturer of the targeted device.	Optional
	version	String	The version of the targeted device.	Optional
	type	String	This value represents the type of the network used to connect to the device. The value must be any one of "WiFi", "BLE", "NFC", "Bluetooth" or "USB".	Optional
	online	Boolean	If the service is available, this value SHALL be true. Otherwise (e.g. the Plug-In has not yet detected any devices or the Plug-In is not allowed to access to any devices), this value SHALL be false.	Mandatory
	scopes	Array	This value SHALL be an array including a string "bca" as an array element (["weight", ...]).	Mandatory

The Plug-In MAY append additional data in the data object as needed.

This data object is sent to the Plug-Ins in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific response channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the response. The data object must be mapped to the Extra directly.

Example of the data object of the Android Explicit Intents

Name	Example of value	Note
Action	"org.deviceconnect.action.RESPONSE"	This value is defined by the GotAPI Server application.
Component	"org.deviceconnect"	This value is the package name of the GotAPI Server application.
Extra		
	requestCode	1
	result	0

	services	<i>[Array Object]</i>	<p>This value is an example. Note that this is "not" a JSON string. This value must be an Array object whose content is the same as the following JSON example:</p> <pre>[{ "id": "org.example.plugin.12345", "name": "Coolest Weight Scale", "manufacturer": "ABC Health Care Inc.", "version": "3.0", "type": "Bluetooth", "online": true, "scopes": ["weight"] }, ...]</pre>
	config	<i>"additional parameters"</i>	<p><i>This name-value pair is an additional data which is not defined by this specification.</i></p>

5.2 One-shot measuring API

One-shot API enables applications to receive measured data from targeted devices by one HTTP request/response transaction as define in the Section 7.2.2 [DWAPI-PCH]. One-shot measuring API specification adheres to that of GotAPI 1.1.

As defined by GotAPI 1.1, after the application obtains authorization to access GotAPI-based APIs using the GotAPI-2 Interface and completes the Service Discovery, the application can use the service (so called "One-shot measuring API") provided by the Plug-In through the GotAPI Server.

The One-shot measuring API offers a measurement result reported by the targeted device in response to a request. The message flow of this API is as shown blow.

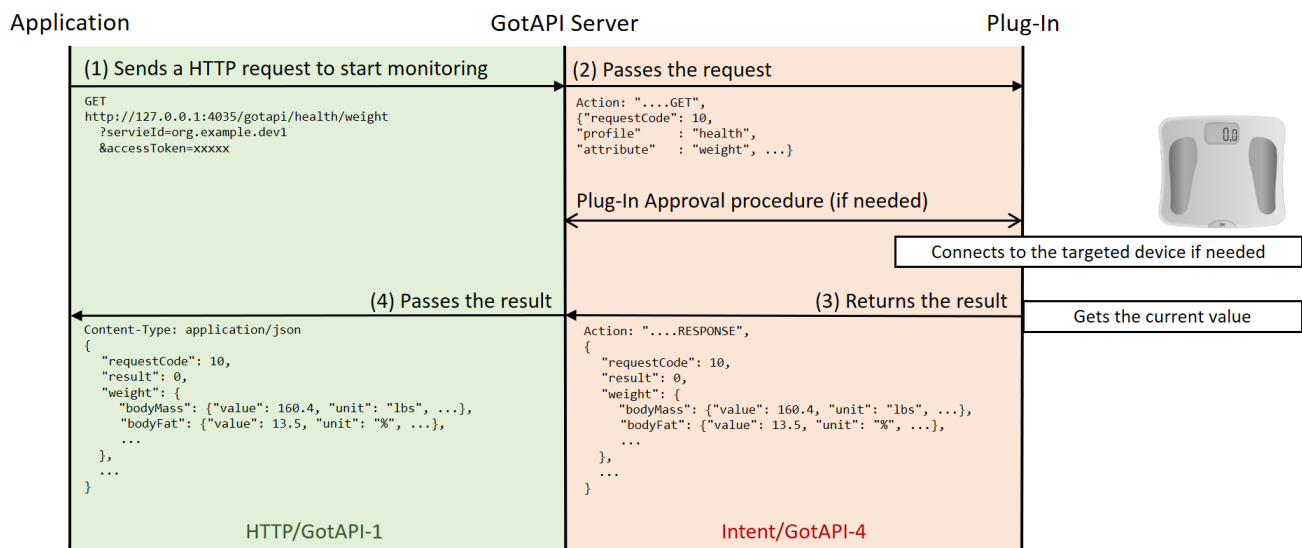


Figure 2: Message flow of the One-shot measuring API

This section defines the data object for all the message flows described in the figure above.

5.2.1 Request for one-shot measuring on the GotAPI-1 Interface

When the application uses the one-shot measuring it sends a request to the GotAPI Server on the GotAPI-1 Interface as follows:

Definition of the HTTP request

Definitions	
Method	HTTP PUT
Request URL	http://127.0.0.1:4035/gotapi/health/weight https://127.0.0.1:4036/gotapi/health/weight

Definition of the request parameters

Parameter name	Definition of value	Mandatory/Optional
serviceId	The identifier of the targeted service. This value is available from the Service Discovery API on the GotAPI-1 Interface.	Mandatory
accessToken	The access token obtained from the GotAPI Auth Server through the GotAPI-2 Interface.	Mandatory
nonce	A nonce generated by the application, which is described in the section "7.3.3.3 HMAC server authentication using trusted Application ID for the Server spoofing attack" in the GotAPI specification.	Optional

Example of the request URL

```
http://127.0.0.1:4035/gotapi/health/weight?serviceId=abcdefg123&accessToken=0987654321&nonce=93b3a219347
```

5.2.2 Request for one-shot measuring on the GotAPI-4 Interface

When an application sends a request to the GotAPI Server on the GotAPI-1 Interface, the GotAPI Server passes the request to the Plug-In on the GotAPI-4 Interface. The request includes the data object as follows:

Definition of the data object for request

Name	Type	Definition of value	Mandatory/Optional
method	String	This value SHALL be "GET".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.
receiver	String	The address of the GotAPI Server application used by Plug-Ins. Generally, it is the application ID recognized by the OS, such as a package name.	Mandatory
requestCode	int	A request code identifying the request. This value could be any number but must MUST be an integer greater than 0, and unique for each open request, to ensure responses can be correlated.	Mandatory
serviceId	String	The identifier of the targeted Service. This value is provided by the application over the GotAPI-1 Interface.	Mandatory
api	String	The value must be "gotapi".	Mandatory
profile	String	The value must be "health".	Mandatory

attribute		String	The value must be "weight"	Mandatory
clientId		String	The identifier of the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory
accessToken		String	The access token for the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory

This data object is sent to the Plug-Ins in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific request channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Explicit Intents

Name	Example of value	Note
Action	org.deviceconnect.action.GET	This value is defined by the GotAPI Server application. But the last part SHALL be "GET".
Component	org.example.plugin	This value is the package name of the Plug-In application.
Extra		
	receiver	org.deviceconnect
	requestCode	10
	servcieId	dev1.example.org
	api	gotapi
	profile	health
	attribute	weight
	clientId	1234567890
	accessToken	0987654321

5.2.3 Response for one-shot measuring on the GotAPI-4 Interface

When the Plug-In receives the request, it SHALL respond to the GotAPI Server as follows:

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional		
method	String	This value SHALL be "RESPONSE".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.		
requestCode	int	The request code coming from the GotAPI Server.	Mandatory		
result	int	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory		
weight			Mandatory		
	device		Mandatory		
		productName	String	The product name of the targeted device. If the Plug-In cannot obtain this information from the targeted device, it SHALL create a name for the device using an arbitrary algorithm. The algorithm is up to the Plug-In implementation, and this specification does not define any algorithms.	Mandatory
		manufacturerName	String	The manufacturer name of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		modelNumber	String	The model number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		firmwareRevision	String	The firmware revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory

		serialNumber	String	The serial number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		softwareRevision	String	The software revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		hardwareRevision	String	The hardware revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		partNumber	String	The part number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		protocolRevision	String	The protocol revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		systemId	String	The system id of the targeted device. This value SHALL be a 16-character HEX string without a '0x' prefix (e.g. "ABCDEF0123456789"). If the Plug-In cannot obtain this information from the targeted device, this value SHALL be "0000000000000000" (a string of 16 '0' characters).	Mandatory
		batteryLevel	Float	The battery level of the targeted device. This value must be a float number in a range from 0.0 to 1.0. The value 0.0 represents that the targeted device is completely out of charge. The value 1.0 represents that the targeted device is fully charged. Even if the targeted device reports this value in percent in a range from 1 to 100, the Plug-In SHALL convert it to a float number in a range from 0.0 to 1.0. If the Plug-In can't obtain battery level from the targeted device, this value SHALL be -1.0.	Mandatory
	bodyMass				Mandatory
		value	Float	This value represents the body mass measured by the targeted device.	Mandatory

		mderFloat	String	This value represents the body mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00644", which means 160.4 lbs if the value of "unit" is "lbs".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188740" (This code means "Body Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported SpO ₂ , which is expressed by a human readable string such as "lbs".	Mandatory
		unitCode	String	This value represents the unit of the reported weight scale, which is expressed by a code such as "263904" (This code means "lbs").	Mandatory
		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyLength				Mandatory if the device reports body length. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body length measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the body length measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF002AD", which means 68.5 inches if the value of "unit" is "inches".	Mandatory

		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Length". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188744" (This code means "Body Length"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported body length, which is expressed by a human readable string such as "inches".	Mandatory
		unitCode	String	This value represents the unit of the reported weight scale, which is expressed by a code such as "263520" (This code means "inches").	Mandatory
		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bmi				Mandatory if the device reports BMI. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the Body Mass Index (BMI) measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the BMI measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FE00096A", which means 24.10 kg/m ² if the value of "unit" is "kg/m2".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "BMI". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory

		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188752" (This code means "BMI"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported BMI, which is expressed by a human readable string such as "kg/m2".	Mandatory
		unitCode	String	This value represents the unit of the reported BMI, which is expressed by a code such as "264096" (This code means "kg/m ² ").	Mandatory
		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyFat		Object		Mandatory if the device reports body fat. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body fat measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the body fat measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF000087", which means 13.5 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Fat". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188748" (This code means "Body Fat"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory

		unit	String	This value represents the unit of the reported body fat, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported body fat, which is expressed by a code such as "262688" (This code means "%").	Mandatory
		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	fatFreeMass		Object		Mandatory if the device reports fat free mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the fat free mass measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the fat free mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00056C", which means 138.8 lbs if the value of "unit" is "lbs".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Fat Free Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188756" (This code means "Fat Free Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported fat free mass, which is expressed by a human readable string such as "lbs".	Mandatory
		unitCode	String	This value represents the unit of the reported fat free mass, which is expressed by a code such as "263904" (This code means "lbs").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	softLeanMass		Object		Mandatory if the device reports soft lean mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the soft lean mass measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the soft lean mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00024C", which means 58.8 kg if the value of "unit" is "kg".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Soft Lean Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188760" (This code means "Soft Lean Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported soft lean mass, which is expressed by a human readable string such as "kg".	Mandatory
		unitCode	String	This value represents the unit of the reported soft lean mass, which is expressed by a code such as "263875" (This code means "kg").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyWater		Object		Mandatory if the device reports body water. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body water measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the body water measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "00000040", which means 64 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body water". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188760" (This code means "Body water"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported body water, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported body water, which is expressed by a code such as "262688" (This code means "%").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	muscleMass		Object		Mandatory if the device reports muscle mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the muscle mass measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the muscle mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "0000002B", which means 43 kg if the value of "unit" is "kg".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Muscle Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188776" (This code means "Muscle Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported muscle mass, which is expressed by a human readable string such as "kg".	Mandatory
		unitCode	String	This value represents the unit of the reported muscle mass, which is expressed by a code such as "263875" (This code means "kg").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	musclePercentage		Object		Mandatory if the device reports muscle percentage. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the muscle percentage measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the muscle percentage measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "0000003B", which means 59 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Muscle Percentage". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188772" (This code means "Muscle Percentage"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported muscle percentage, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported muscle percentage, which is expressed by a code such as "262688" (This code means "%").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	basalMetabolism		Object		Mandatory if the device reports basal metabolism. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the basal metabolism measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the basal metabolism measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "030004BE", which means 1214000 joules if the value of "unit" is "joules".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Basal Metabolism". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188768" (This code means "Basal Metabolism"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported basal metabolism, which is expressed by a human readable string such as "joules".	Mandatory
		unitCode	String	This value represents the unit of the reported basal metabolism, which is expressed by a code such as "266112" (This code means "joules").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	impedance		Object		Mandatory if the device reports impedance. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the impedance measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the impedance measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00B26E", which means 4567.8 ohms if the value of "unit" is "ohms".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Impedance". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188780" (This code means "Impedance"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported impedance, which is expressed by a human readable string such as "ohms".	Mandatory
		unitCode	String	This value represents the unit of the reported impedance, which is expressed by a code such as "266432" (This code means "ohms").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory

The Plug-In MAY append additional data in the data object as needed.

This data object is sent to the GotAPI Server in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific response channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Intents

Name	Example of value			Note
Action			org.deviceconnect.action.RESPONSE	This value is defined by the GotAPI Server application. But the last part SHALL be "RESPONSE".
Component			org.deviceconnect	This value is the package name of the GotAPI Server application.
Extra				
	requestCode		10	
	result		0	
	weight			
		device		
		productName	ABC Pulse Weight Scale Pro	
		manufacturerName	ABC Inc.	
		modelName	TP-001	
		firmwareRevision	rev.1.001.003	
		serialNumber	01234-5678-9ABCD-EF01	
		softwareRevision	rev.2.000.000	
		hardwareRevision	rev.1.0	

			partNumber	002	
			protocolRevision	rev.3.1	
			systemId	ABCDEF0123456789	
			batteryLevel	0.5	
		bodyMass			
			value	160.4	
			mdcrFloat	FF00644	
			type	Body Mass	
			typeCode	188740	
			unit	lbs	
			unitCode	263904	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		bodyLength			
			value	68.5	
			mdcrFloat	FF002AD	
			type	Body Length	
			typeCode	188744	
			unit	inches	
			unitCode	263520	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		bmi			
			value	24.10	
			mdcrFloat	FE00096A	
			type	BMI	
			typeCode	188752	
			unit	kg/m2	
			unitCode	264096	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		bodyFat			
			value	13.5	
			mdcrFloat	FF000087	

			type	Body Fat	
			typeCode	188748	
			unit	%	
			unitCode	262688	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		fatFreeMass			
			value	138.8	
			mderFloat	FF00056C	
			type	Fat Free Mass	
			typeCode	188756	
			unit	lbs	
			unitCode	263904	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		softLeanMass			
			value	58.8	
			mderFloat	FF00024C	
			type	Soft Lean Mass	
			typeCode	188760	
			unit	kg	
			unitCode	263875	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		bodyWater			
			value	64	
			mderFloat	00000040	
			type	Body water	
			typeCode	188760	
			unit	%	
			unitCode	262688	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		muscleMass			
			value	43	

			mdrFloat	0000002B	
			type	Muscle Mass	
			typeCode	188776	
			unit	kg	
			unitCode	263875	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		musclePercentage			
			value	59	
			mdrFloat	0000003B	
			type	Muscle Percentage	
			typeCode	188772	
			unit	%	
			unitCode	262688	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		basalMetabolism			
			value	1214000	
			mdrFloat	030004BE	
			type	Basal Metabolism	
			typeCode	188768	
			unit	joules	
			unitCode	266112	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	
		impedance			
			value	4567.8	
			mdrFloat	FF00B26E	
			type	Impedance	
			typeCode	188780	
			unit	ohms	
			unitCode	266432	
			timeStamp	1431856940275	
			timeStampString	20150517100220.000-0000	

Editor's note:

The extra data of Android is just a key-value structure. How should such structured data above be expressed? JSON string?

```
intent.putExtra ("weight". "{ \"deviceProductName\": \"ABC Weight Scale Pro\". ... }");
```

5.2.4 Response for one-shot measuring on the GotAPI-1 Interface

When GotAPI Server receives the response from the Plug-In, the GotAPI Server passes it to the application as follows:

Definition of the HTTP response

Definitions	
MIME-Type	application/json
HTTP status	200 OK

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional		
product	String	The name of the GotAPI Server (e.g. "ABConnect")	Mandatory		
version	String	The version of the GotAPI Server (e.g. "1.0").	Mandatory		
result	Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory		
weight			Mandatory		
	device		Mandatory		
		productName	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		manufacturerName	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		modelNumber	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		firmwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		serialNumber	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		softwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		hardwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		partNumber	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		protocolRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		systemId	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		batteryLevel	Number	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyMass		Object		Mandatory
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyLength		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bmi		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyFat		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	fatFreeMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

	softLeanMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyWater		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	muscleMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	musclePercentage		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	basalMetabolism		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	impedance		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
hmac			String	An HMAC generated for the counter measure against the GotAPI Server spoofing attack. If the application includes a key for HMAC calculation in the API request, the GotAPI Server adds this value in the API response. Evaluating whether the HMAC is identical to the result of calculation of HMAC from the key, the application can ensure that the response is genuine.	Mandatory if the application provide a key to the GotAPI Server

The GotAPI Server SHALL serialize the data structure above as a JSON formatted stream (i.e. JSON string).

Example of the response

```
{
  "product"      : "ABCConnect",
  "version"      : "1.0",
  "requestCode"  : 10,
  "result"       : 0,
  "weight"       : {
    "device": {
      "productName"      : "ABC Weight Scale Pro",
      "manufacturerName" : "ABC Inc.",
      "modelNumber"      : "TP-001",
      "firmwareRevision" : "rev.1.001.003",
      "serialNumber"     : "01234-5678-9ABCD-EF01",
      "softwareRevision" : "rev.2.000.000",
      "hardwareRevision" : "rev.1.0",
      "partNumber"       : "002",
      "protocolRevision" : "rev.3.1",
      "systemId"         : "ABCDEF0123456789",
      "batteryLevel"     : 0.5
    },
    "bodyMass": {
      "value"           : 160.4,
      "mderFloat"       : "FF00644",
    }
  }
}
```

```
"type"      : "Body Mass",
"typeCode"  : "188740",
"unit"      : "lbs",
"unitCode"  : "263904",
"timestamp" : 1431856940275,
"timestampString" : "20150517100220.000-0000"
},
"bodyLength": {
  "value"      : 68.5,
  "mderFloat"  : "FF002AD",
  "type"       : "Body Length",
  "typeCode"   : "188744",
  "unit"       : "inches",
  "unitCode"   : "263520",
  "timestamp"  : 1431856940275,
  "timestampString" : "20150517100220.000-0000"
},
"bmi": {
  "value"      : 24.10
  "mderFloat"  : "FE00096A",
  "type"       : "BMI",
  "typeCode"   : "188752",
  "unit"       : "kg/m2",
  "unitCode"   : "264096",
  "timestamp"  : 1431856940275,
  "timestampString" : "20150517100220.000-0000"
},
"bodyFat": {
  "value"      : 13.5,
  "mderFloat"  : "FF000087",
  "type"       : "Body Fat",
  "typeCode"   : "188748",
  "unit"       : "%",
  "unitCode"   : "262688",
  "timestamp"  : 1431856940275,
  "timestampString" : "20150517100220.000-0000"
},
"fatFreeMass": {
  "value"      : 138.8,
  "mderFloat"  : "FF00056C",
  "type"       : "Fat Free Mass",
  "typeCode"   : "188756",
  "unit"       : "lbs",
  "unitCode"   : "263904",
  "timestamp"  : 1431856940275,
  "timestampString" : "20150517100220.000-0000"
},
"softLeanMass": {
  "value"      : 58.8,
  "mderFloat"  : "FF00024C",
  "type"       : "Soft Lean Mass",
  "typeCode"   : "188760",
  "unit"       : "kg",
```

```
"unitCode"      : "263875",
"timeStamp"     : 1431856940275,
"timeStampString" : "20150517100220.000-0000"
},
"bodyWater": {
  "value"       : 64,
  "mderFloat"   : "00000040",
  "type"        : "Body water",
  "typeCode"    : "188760",
  "unit"        : "%",
  "unitCode"    : "262688",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"muscleMass": {
  "value"       : 43,
  "mderFloat"   : "0000002B",
  "type"        : "Muscle Mass",
  "typeCode"    : "188776",
  "unit"        : "kg",
  "unitCode"    : "263875",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"musclePercentage": {
  "value"       : 59,
  "mderFloat"   : "0000003B",
  "type"        : "Muscle Percentage",
  "typeCode"    : "188772",
  "unit"        : "%",
  "unitCode"    : "262688",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"basalMetabolism": {
  "value"       : 1214000,
  "mderFloat"   : "030004BE",
  "type"        : "Basal Metabolism",
  "typeCode"    : "188768",
  "unit"        : "joules",
  "unitCode"    : "266112",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"impedance": {
  "value"       : 4567.8,
  "mderFloat"   : "FF00B26E",
  "type"        : "Impedance",
  "typeCode"    : "188780",
  "unit"        : "ohms",
  "unitCode"    : "266432",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
```

```

    }
  },
  "hmac"      : "0123456789"
}

```

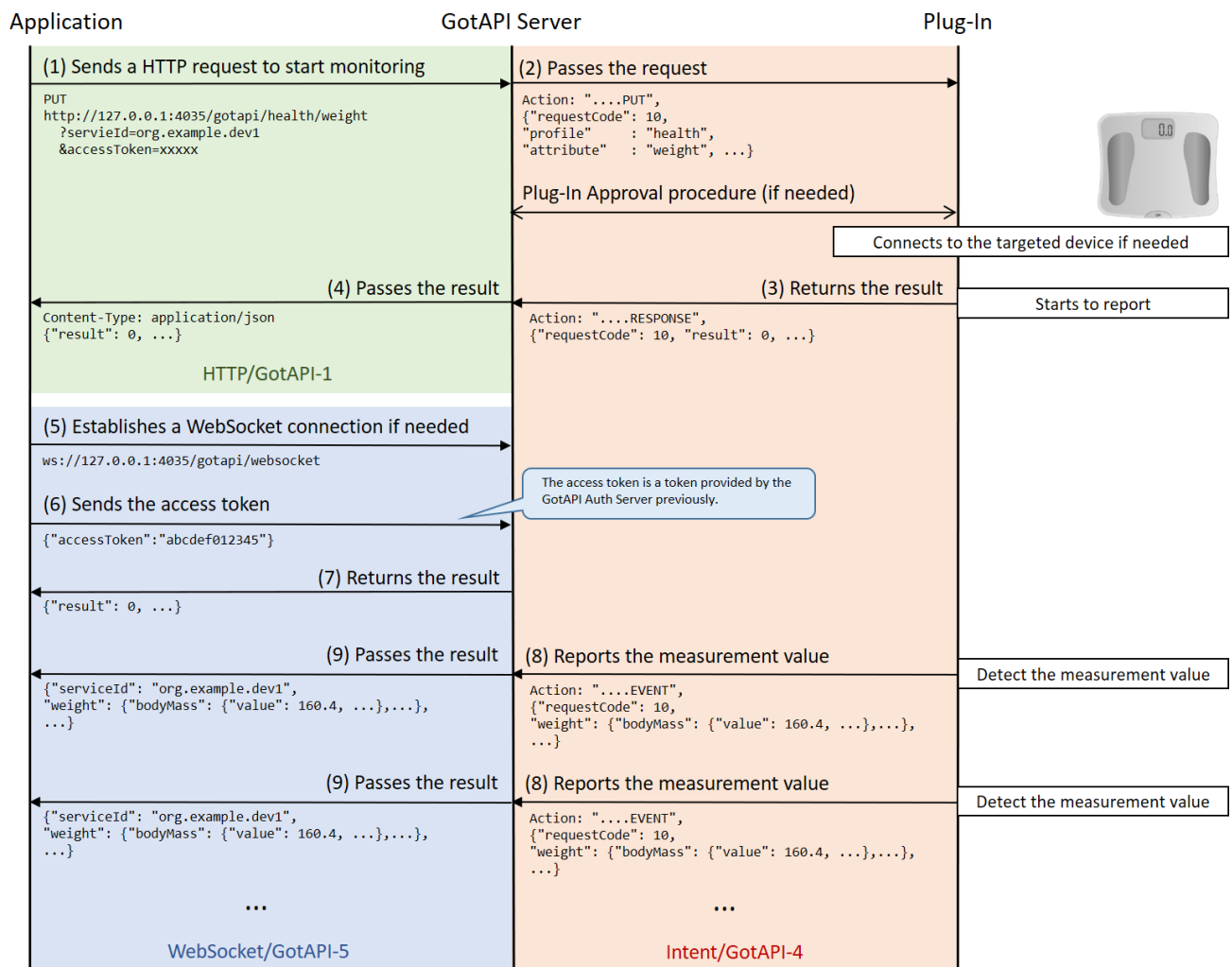
5.3 Asynchronous messaging API

Asynchronous messaging API enables applications to receive measured data from the targeted device asynchronously using WebSocket as define in the Section 7.2.3 [DWAPI-PCH]. Asynchronous messaging API specification adheres to that of GotAPI 1.1.

As defined by GotAPI 1.1, after the application obtains authorization to access GotAPI-based APIs using the GotAPI-2 Interface and completes the Service Discovery, the application can use the service (so called "Asynchronous messaging API") provided by the Plug-In through the GotAPI Server.

The asynchronous messaging API offers a series of measurement values reported by the targeted device to an application in real time as the measurement values become available. The timing when and the reasons why such measurement values become available is determined by the Plug-Ins and connected devices, and is out of the scope of this specification.

This API uses WebSocket protocol to handle asynchronous event messages. The message flow of this API is shown blow:



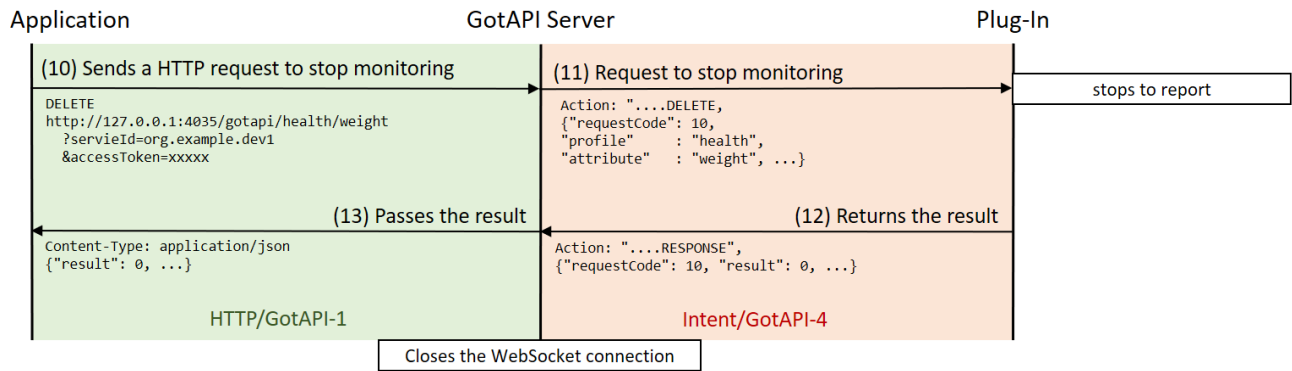


Figure 3: Message Flow of the Asynchronous messaging API

This section defines the data object for the message flows labelled from (1) to (4) and from (8) to (13) described in the figure above.

5.3.1 Request for asynchronous messaging on the GotAPI-1 Interface

When the application uses the API in order to receive asynchronous messages, it sends a request to the GotAPI Server on the GotAPI-1 Interface as follows:

Definition of the HTTP request

Definitions	
Method	HTTP PUT
Request URL	http://127.0.0.1:4035/gotapi/health/weight https://127.0.0.1:4036/gotapi/health/weight

Definition of the request parameters

Parameter name	Definition of value	Mandatory/Optional
serviceId	The identifier of the targeted service. This value is available from the Service Discovery API on the GotAPI-1 Interface.	Mandatory
accessToken	The access token obtained from the GotAPI Auth Server through the GotAPI-2 Interface.	Mandatory
nonce	A nonce generated by the application, which is described in the section "7.3.3.3 HMAC server authentication using trusted Application ID for the Server spoofing attack" in the GotAPI specification.	Optional

Example of the request URL

http://127.0.0.1:4035/gotapi/health/weight?serviceId=abcdefg123&accessToken=0987654321&nonce=93b3a219347

5.3.2 Request for asynchronous messaging on the GotAPI-4 Interface

When an application sends a request to the GotAPI Server on the GotAPI-1 Interface, the GotAPI Server passes the request to the Plug-In on the GotAPI-4 Interface. The request includes the data object as follows:

Definition of the data object for request

Name	Type	Definition of value	Mandatory/Optional
method	String	This value SHALL be "PUT".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.
receiver	String	The address of the GotAPI Server application used by Plug-Ins. Generally, it is the application ID recognized by the OS, such as a package name.	Mandatory
requestCode	int	A request code identifying the request. This value could be any number but must MUST be an integer greater than 0, and unique for each open request, to ensure responses can be correlated.	Mandatory
serviceId	String	The identifier of the targeted Service. This value is provided by the application over the GotAPI-1 Interface.	Mandatory
api	String	The value must be "gotapi".	Mandatory
profile	String	The value must be "health".	Mandatory
attribute	String	The value must be "weight"	Mandatory
clientId	String	The identifier of the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory
accessToken	String	The access token for the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory

This data object is sent to the Plug-Ins in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific request channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Explicit Intents

Name	Example of value	Note
Action	org.deviceconnect.action.PUT	This value is defined by the GotAPI Server application. But the last part SHALL be "PUT".
Component	org.example.plugin	This value is the package name of the Plug-In application.
Extra		

	receiver	org.deviceconnect	
	requestCode	10	
	servcieId	dev1.example.org	
	api	gotapi	
	profile	health	
	attribute	weight	
	clientId	1234567890	
	accessToken	0987654321	

5.3.3 Response for asynchronous messaging on the GotAPI-4 Interface

When the Plug-In receives the request, it SHALL respond to the GotAPI Server as follows:

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional	
method	String	This value SHALL be "RESPONSE".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.	
requestCode	Number	The request code coming from the GotAPI Server.	Mandatory	
result	Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory	
weight			Mandatory	
device	Object		Mandatory	
	productName	String	The product name of the targeted device. If the Plug-In cannot obtain this information from the targeted device, it SHALL create a name for the device using an arbitrary algorithm. The algorithm is up to the Plug-In implementation, and this specification does not define any algorithms.	Mandatory
	manufacturerName	String	The manufacturer name of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory

		modelName	String	The model number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		firmwareRevision	String	The firmware revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		serialNumber	String	The serial number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		softwareRevision	String	The software revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		hardwareRevision	String	The hardware revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		partNumber	String	The part number of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		protocolRevision	String	The protocol revision of the targeted device. If the Plug-In cannot obtain this information from the targeted device, this value SHALL be an empty string.	Mandatory
		systemId	String	The system id of the targeted device. This value SHALL be a 16-character HEX string without a '0x' prefix (e.g. "ABCDEF0123456789"). If the Plug-In cannot obtain this information from the targeted device, this value SHALL be "0000000000000000" (a string of 16 '0' characters).	Mandatory

The Plug-In MAY append additional data in the data object as needed.

This data object is sent to the GotAPI Server in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific response channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Intents

Name		Example of value		Note
Action			org.deviceconnect.action.RESPONSE	This value is defined by the GotAPI Server application. But the last part SHALL be "RESPONSE".
Component			org.deviceconnect	This value is the package name of the GotAPI Server application.
Extra				
	requestCode		10	
	result		0	
	weight			
		device		
		productName	ABC Weight Scale Pro	
		manufacturerName	ABC Inc.	
		modelName	TP-001	
		firmwareRevision	rev.1.001.003	
		serialNumber	01234-5678-9ABCD-EF01	
		softwareRevision	rev.2.000.000	
		hardwareRevision	rev.1.0	
		partNumber	002	
		protocolRevision	rev.3.1	
		systemId	ABCDEF0123456789	

Editor's note:

The extra data of Android is just a key-value structure. How should such structured data above be expressed? JSON string?

```
intent.putExtra ("weight", "{\"deviceProductName\": \"ABC Weight Scale Pro\", ...}");
```

5.3.4 Response for asynchronous messaging on the GotAPI-1 Interface

When GotAPI Server receives the response from the Plug-In, the GotAPI Server passes it to the application as follows:

Definition of the HTTP response

Definitions	
MIME-Type	application/json
HTTP status	200 OK

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional	
product	String	The name of the GotAPI Server (e.g. "ABConnect")	Mandatory	
version	String	The version of the GotAPI Server (e.g. "1.0").	Mandatory	
result	Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory	
weight	Object		Mandatory	
	device		Mandatory	
	productName	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	manufacturerName	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	modelName	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	firmwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	serialNumber	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	softwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	hardwareRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	partNumber	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	protocolRevision	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	systemId	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

hmac			String	An HMAC generated for the counter measure against the GotAPI Server spoofing attack. If the application includes a key for HMAC calculation in the API request, the GotAPI Server adds this value in the API response. Evaluating whether the HMAC is identical to the result of calculation of HMAC from the key, the application can ensure that the response is genuine.	Mandatory if the application provide a key to the GotAPI Server
------	--	--	--------	--	---

The GotAPI Server SHALL serialize the data structure above as a JSON formatted stream (i.e. JSON string).

Example of the response

```
{
  "product" : "ABCConnect",
  "version" : "1.0",
  "requestCode" : 10,
  "result" : 0,
  "weight" : {
    "device": {
      "productName" : "ABC Weight Scale Pro",
      "manufacturerName" : "ABC Inc.",
      "modelName" : "TP-001",
      "firmwareRevision" : "rev.1.001.003",
      "serialNumber" : "01234-5678-9ABCD-EF01",
      "softwareRevision" : "rev.2.000.000",
      "hardwareRevision" : "rev.1.0",
      "partNumber" : "002",
      "protocolRevision" : "rev.3.1",
      "systemId" : "ABCDEF0123456789"
    }
  },
  "hmac" : "0123456789"
}
```

5.3.5 Asynchronous message from the Plug-In to the GotAPI Server on the GotAPI-4 Interface

The Plug-In sends an asynchronous message as follows:

Definition of the data object for request

Name	Type	Definition of value	Mandatory/Optional
method	String	This value SHALL be "EVENT".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.
requestCode	int	The request code coming from the GotAPI Server.	Mandatory

result			Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory
weight			Object		Mandatory
	device		Object		Mandatory
		batteryLevel	Float	The battery level of the targeted device. This value must be a float number in a range from 0.0 to 1.0. The value 0.0 represents that the targeted device is completely out of charge. The value 1.0 represents that the targeted device is fully charged. Even if the targeted device reports this value in percent in a range from 1 to 100, the Plug-In SHALL convert it to a float number in a range from 0.0 to 1.0. If the Plug-In can't obtain battery level from the targeted device, this value SHALL be -1.0.	Mandatory
	bodyMass				Mandatory
		value	Float	This value represents the body mass measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the body mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00644", which means 160.4 lbs if the value of "unit" is "lbs".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188740" (This code means "Body Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported SpO ₂ , which is expressed by a human readable string such as "lbs".	Mandatory
		unitCode	String	This value represents the unit of the reported weight scale, which is expressed by a code such as "263904" (This code means "lbs").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyLength				Mandatory if the device reports body length. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body length measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the body length measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF002AD", which means 68.5 inches if the value of "unit" is "inches".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Length". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188744" (This code means "Body Length"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported body length, which is expressed by a human readable string such as "inches".	Mandatory
		unitCode	String	This value represents the unit of the reported weight scale, which is expressed by a code such as "263520" (This code means "inches").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bmi				Mandatory if the device reports BMI. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the Body Mass Index (BMI) measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the BMI measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FE00096A", which means 24.10 kg/m ² if the value of "unit" is "kg/m ² ".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "BMI". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188752" (This code means "BMI"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported BMI, which is expressed by a human readable string such as "kg/m ² ".	Mandatory
		unitCode	String	This value represents the unit of the reported BMI, which is expressed by a code such as "264096" (This code means "kg/m ² ").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyFat		Object		Mandatory if the device reports body fat. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body fat measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the body fat measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00087", which means 13.5 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body Fat". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188748" (This code means "Body Fat"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported body fat, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported body fat, which is expressed by a code such as "262688" (This code means "%").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	fatFreeMass		Object		Mandatory if the device reports fat free mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the fat free mass measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the fat free mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00056C", which means 138.8 lbs if the value of "unit" is "lbs".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Fat Free Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188756" (This code means "Fat Free Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported fat free mass, which is expressed by a human readable string such as "lbs".	Mandatory
		unitCode	String	This value represents the unit of the reported fat free mass, which is expressed by a code such as "263904" (This code means "lbs").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	softLeanMass		Object		Mandatory if the device reports soft lean mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the soft lean mass measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the soft lean mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00024C", which means 58.8 kg if the value of "unit" is "kg".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Soft Lean Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188760" (This code means "Soft Lean Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported soft lean mass, which is expressed by a human readable string such as "kg".	Mandatory
		unitCode	String	This value represents the unit of the reported soft lean mass, which is expressed by a code such as "263875" (This code means "kg").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	bodyWater		Object		Mandatory if the device reports body water. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the body water measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the body water measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "00000040", which means 64 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Body water". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188760" (This code means "Body water"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported body water, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported body water, which is expressed by a code such as "262688" (This code means "%").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	muscleMass		Object		Mandatory if the device reports muscle mass. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the muscle mass measured by the targeted device.	Mandatory
		mdrFloat	String	This value represents the muscle mass measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "0000002B", which means 43 kg if the value of "unit" is "kg".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Muscle Mass". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188776" (This code means "Muscle Mass"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported muscle mass, which is expressed by a human readable string such as "kg".	Mandatory
		unitCode	String	This value represents the unit of the reported muscle mass, which is expressed by a code such as "263875" (This code means "kg").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	musclePercentage		Object		Mandatory if the device reports muscle percentage. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the muscle percentage measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the muscle percentage measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "000003B", which means 59 % if the value of "unit" is "%".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Muscle Percentage". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188772" (This code means "Muscle Percentage"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported muscle percentage, which is expressed by a human readable string such as "%".	Mandatory
		unitCode	String	This value represents the unit of the reported muscle percentage, which is expressed by a code such as "262688" (This code means "%").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	basalMetabolism		Object		Mandatory if the device reports basal metabolism. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the basal metabolism measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the basal metabolism measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "030004BE", which means 1214000 joules if the value of "unit" is "joules".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Basal Metabolism". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188768" (This code means "Basal Metabolism"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported basal metabolism, which is expressed by a human readable string such as "joules".	Mandatory
		unitCode	String	This value represents the unit of the reported basal metabolism, which is expressed by a code such as "266112" (This code means "joules").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory
	impedance		Object		Mandatory if the device reports impedance. Otherwise, this SHALL NOT exist.
		value	Float	This value represents the impedance measured by the targeted device.	Mandatory
		mderFloat	String	This value represents the impedance measured by the targeted device, which is a hexadecimal string of an MDER FLOAT, such as "FF00B26E", which means 4567.8 ohms if the value of "unit" is "ohms".	Mandatory
		type	String	This value represents the TYPE attribute as a human readable string and as its 32-bit MDC code such as "Impedance". If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		typeCode	String	This value represents the TYPE attribute, which is expressed by a code such as "188780" (This code means "Impedance"). If the Plug-In can't obtain the type, this value SHALL be an empty string.	Mandatory
		unit	String	This value represents the unit of the reported impedance, which is expressed by a human readable string such as "ohms".	Mandatory
		unitCode	String	This value represents the unit of the reported impedance, which is expressed by a code such as "266432" (This code means "ohms").	Mandatory

		timeStamp	int	This value represents the measurement time when the measurement was done. If the measurement time is reported from the targeted device, the Plug-In SHALL convert it to a unix time stamp in millisecond. Otherwise, the Plug-In set this value to the unix time when the Plug-In receives the measurement value from the Plug-In based on the clock of the underlying operating system.	Mandatory
		timeStampString	String	This value represents the same time stamp as "timeStamp". The format is "YYYYMMDDHHMMSS.sss+/-HHMM", such as "20150504135813.220-0400"	Mandatory

The Plug-In MAY append additional data in the data object as needed.

This data object is sent to the Plug-Ins in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific request channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Explicit Intents

Name	Extra key name	Example of value	Note
Action		org.deviceconnect.action.EVENT	This value is defined by the GotAPI Server application. But the last part SHALL be "EVENT".
Component		org.example.plugin	This value is the package name of the Plug-In application.
Extra			
	requestCode	10	
	result	0	
	weight		
	device		
		deviceBatteryLevel	0.5
	bodyMass		
		value	160.4
		mderFloat	FF00644
		type	Body Mass
		typeCode	188740
		unit	lbs
		unitCode	263904
		timeStamp	1431856940275

			timeStampString	20150517100220.000-0000
		bodyLength		
			value	68.5
			mderFloat	FF002AD
			type	Body Length
			typeCode	188744
			unit	inches
			unitCode	263520
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		bmi		
			value	24.10
			mderFloat	FE00096A
			type	BMI
			typeCode	188752
			unit	kg/m2
			unitCode	264096
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		bodyFat		
			value	13.5
			mderFloat	FF000087
			type	Body Fat
			typeCode	188748
			unit	%
			unitCode	262688
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		fatFreeMass		
			value	138.8
			mderFloat	FF00056C
			type	Fat Free Mass
			typeCode	188756
			unit	lbs
			unitCode	263904

			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		softLeanMass		
			value	58.8
			mderFloat	FF00024C
			type	Soft Lean Mass
			typeCode	188760
			unit	kg
			unitCode	263875
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		bodyWater		
			value	64
			mderFloat	00000040
			type	Body water
			typeCode	188760
			unit	%
			unitCode	262688
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		muscleMass		
			value	43
			mderFloat	0000002B
			type	Muscle Mass
			typeCode	188776
			unit	kg
			unitCode	263875
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		musclePercentage		
			value	59
			mderFloat	0000003B
			type	Muscle Percentage
			typeCode	188772

			unit	%
			unitCode	262688
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		basalMetabolism		
			value	1214000
			mderFloat	030004BE
			type	Basal Metabolism
			typeCode	188768
			unit	joules
			unitCode	266112
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000
		impedance		
			value	4567.8
			mderFloat	FF00B26E
			type	Impedance
			typeCode	188780
			unit	ohms
			unitCode	266432
			timeStamp	1431856940275
			timeStampString	20150517100220.000-0000

Editor's note:

The extra data of Android is just a key-value structure. How should such structured data above be expressed? JSON string?

```
intent.putExtra ("weight", "{\"deviceProductName\":\"ABC Weight Scale Pro\", ...}");
```

5.3.6 Asynchronous message from the GotAPI Server to the application on the GotAPI-5 Interface

When the GotAPI Server receives an asynchronous message from the Plug-In, the GotAPI Server passes it to the application on the GotAPI-5 Interface. The format of the data is a JSON string as follows:

Definition of the data object

Name	Sub name		Type	Definition of value	Mandatory/Optional
serviceId			String	The identifier of the targeted Service. This value is provided by the application when the application send the originated API request on the GotAPI-1 Interface.	Mandatory
weight			Object		Mandatory
	device		Object		Mandatory
		batteryLevel	Number	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyMass		Object		Mandatory
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyLength		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bmi		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

	bodyFat		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	fatFreeMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	softLeanMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	bodyWater		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	muscleMass		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	musclePercentage		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory

		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	basalMetabolism		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.
		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
	impedance		Object		Mandatory if the Plug-In reports this data set. Otherwise, this SHALL NOT exist.

		value	Float	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		mderFloat	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		type	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		typeCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unit	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		unitCode	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStamp	int	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
		timeStampString	String	This value SHALL be the same as what the GotAPI Server received from the Plug-In.	Mandatory
hmac			String	An HMAC generated for the counter measure against the GotAPI Server spoofing attack. If the application includes a key for HMAC calculation in the API request, the GotAPI Server adds this value in the API response. Evaluating whether the HMAC is identical to the result of calculation of HMAC from the key, the application can ensure that the response is genuine.	Mandatory if the application provide a key to the GotAPI Server

Example of the JSON string

```
{
  "serviceId" : 0,
  "weight" : {
    "device": {
      "batteryLevel"      : 0.5
    },
    "bodyMass": {
      "value"             : 160.4,
      "mderFloat"         : "FF00644",
      "type"               : "Body Mass",
      "typeCode"          : "188740",
      "unit"               : "lbs",
      "unitCode"          : "263904",
      "timeStamp"         : 1431856940275,
      "timeStampString"   : "20150517100220.000-0000"
    },
    "bodyLength": {
```

```
"value"           : 68.5,
"mderFloat"       : "FF002AD",
"type"            : "Body Length",
"typeCode"        : "188744",
"unit"            : "inches",
"unitCode"        : "263520",
"timeStamp"       : 1431856940275,
"timeStampString" : "20150517100220.000-0000"
},
"bmi": {
  "value"           : 24.10
  "mderFloat"       : "FE00096A",
  "type"            : "BMI",
  "typeCode"        : "188752",
  "unit"            : "kg/m2",
  "unitCode"        : "264096",
  "timeStamp"       : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"bodyFat": {
  "value"           : 13.5,
  "mderFloat"       : "FF000087",
  "type"            : "Body Fat",
  "typeCode"        : "188748",
  "unit"            : "%",
  "unitCode"        : "262688",
  "timeStamp"       : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"fatFreeMass": {
  "value"           : 138.8,
  "mderFloat"       : "FF00056C",
  "type"            : "Fat Free Mass",
  "typeCode"        : "188756",
  "unit"            : "lbs",
  "unitCode"        : "263904",
  "timeStamp"       : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"softLeanMass": {
  "value"           : 58.8,
  "mderFloat"       : "FF00024C",
  "type"            : "Soft Lean Mass",
  "typeCode"        : "188760",
  "unit"            : "kg",
  "unitCode"        : "263875",
  "timeStamp"       : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"bodyWater": {
  "value"           : 64,
  "mderFloat"       : "00000040",
  "type"            : "Body water",
```

```
"typeCode"      : "188760",
"unit"          : "%",
"unitCode"     : "262688",
"timeStamp"    : 1431856940275,
"timeStampString" : "20150517100220.000-0000"
},
"muscleMass": {
  "value"       : 43,
  "mderFloat"   : "0000002B",
  "type"        : "Muscle Mass",
  "typeCode"    : "188776",
  "unit"        : "kg",
  "unitCode"    : "263875",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"musclePercentage": {
  "value"       : 59,
  "mderFloat"   : "0000003B",
  "type"        : "Muscle Percentage",
  "typeCode"    : "188772",
  "unit"        : "%",
  "unitCode"    : "262688",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"basalMetabolism": {
  "value"       : 1214000,
  "mderFloat"   : "030004BE",
  "type"        : "Basal Metabolism",
  "typeCode"    : "188768",
  "unit"        : "joules",
  "unitCode"    : "266112",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
},
"impedance": {
  "value"       : 4567.8,
  "mderFloat"   : "FF00B26E",
  "type"        : "Impedance",
  "typeCode"    : "188780",
  "unit"        : "ohms",
  "unitCode"    : "266432",
  "timeStamp"   : 1431856940275,
  "timeStampString" : "20150517100220.000-0000"
}
},
"hmac"          : "0123456789"
}
```

5.3.7 Stop request from the application to the GotAPI Server on the GotAPI-1 Interface

When the application wants to stop receiving asynchronous messages, it sends a request to the GotAPI Server on the GotAPI-1 Interface as follows:

Definition of the HTTP request

Definitions	
Method	HTTP DELETE
Request URL	http://127.0.0.1:4035/gotapi/health/weight https://127.0.0.1:4036/gotapi/health/weight

Definition of the request parameters

Parameter name	Definition of value	Mandatory/Optional
serviceId	The identifier of the targeted service. This value is available from the Service Discovery API on the GotAPI-1 Interface.	Mandatory
accessToken	The access token obtained from the GotAPI Auth Server through the GotAPI-2 Interface.	Mandatory
nonce	A nonce generated by the application, which is described in the section "7.3.3.3 HMAC server authentication using trusted Application ID for the Server spoofing attack" in the GotAPI specification.	Optional

Example of the request URL

```
http://127.0.0.1:4035/gotapi/health/weight?serviceId=abcdefg123&accessToken=0987654321&nonce=93b3a219347
```

5.3.8 Stop request from the GotAPI Server to the Plug-In on the GotAPI-4 Interface

When the GotAPI Server receives a stop request from the application on the GotAPI-1 Interface, the GotAPI Server sends a stop request to the Plug-in on the GotAPI-4 Interface. The request includes the data object as follows:

Definition of the data object for request

Name	Type	Definition of value	Mandatory/Optional
method	String	This value SHALL be "DELETE".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.
receiver	String	The address of the GotAPI Server application used by Plug-Ins. Generally, it is the application ID recognized by the OS, such as a package name.	Mandatory
requestCode	int	A request code identifying the request. This value could be any number but must MUST be an integer greater than 0, and unique for each open request, to ensure responses can be correlated.	Mandatory
serviceId	String	The identifier of the targeted Service. This value is provided by the application over the GotAPI-1 Interface.	Mandatory

api		String	The value must be "gotapi".	Mandatory
profile		String	The value must be "health".	Mandatory
attribute		String	The value must be "weight"	Mandatory
clientId		String	The identifier of the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory
accessToken		String	The access token for the application, which is generated by the Plug-In when the Plug-In Approval procedure defined in the GotAPI specification.	Mandatory

This data object is sent to the Plug-Ins in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific request channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Explicit Intents

Name	Example of value	Note
Action	org.deviceconnect.action.DELETE	This value is defined by the GotAPI Server application. But the last part SHALL be "DELETE".
Component	org.example.plugin	This value is the package name of the Plug-In application.
Extra		
	receiver	org.deviceconnect
	requestCode	10
	servcieId	dev1.example.org
	api	gotapi
	profile	health
	attribute	weight
	clientId	1234567890
	accessToken	0987654321

5.3.9 Stop response from the Plug-In to the GotAPI Server on the GotAPI-4 Interface

When the Plug-In receives the stop request, it SHALL respond as follows:

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional
method	String	This value SHALL be "RESPONSE".	Mandatory if the OS is not Android. Otherwise, optional. If the OS is Android, the "Action" value SHALL include this information as described below.

requestCode	Number	The request code coming from the GotAPI Server.	Mandatory
result	Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory

The Plug-In MAY append additional data in the data object as needed.

This data object is sent to the GotAPI Server in an OS specific mechanism, e.g., Intents for Android.

Requirements for OS-specific response channel and data container

OS	Description
Android	The GotAPI Server must use Explicit Intents for the request. The data object must be mapped to the Extra directly.

Example of the data object of the Android Intents

Name	Sub name	Example of value	Note
Action		org.deviceconnect.action.RESPONSE	This value is defined by the GotAPI Server application. But the last part SHALL be "RESPONSE".
Component		org.deviceconnect	This value is the package name of the GotAPI Server application.
Extra			
	requestCode	10	
	result	0	

5.3.10 Stop response from the GotAPI Server to the application on the GotAPI-1 Interface

When the GotAPI Server receives the stop response, the GotAPI Server passes the response to the application follows:

Definition of the HTTP response

Definitions	
MIME-Type	application/json
HTTP status	200 OK

Definition of the data object for the response

Name	Type	Definition of value	Mandatory/Optional
product	String	The name of the GotAPI Server (e.g. "ABConnect")	Mandatory
version	String	The version of the GotAPI Server (e.g. "1.0").	Mandatory
result	Number	If success, the value is 0, otherwise an integer greater than 0, which indicates an error code. This specification doesn't define error codes.	Mandatory
hmac	String	An HMAC generated for the counter measure against the GotAPI Server spoofing attack. If the application includes a key for HMAC	Mandatory if the application provide a key to the GotAPI

		calculation in the API request, the GotAPI Server adds this value in the API response. Evaluating whether the HMAC is identical to the result of calculation of HMAC from the key, the application can ensure that the response is genuine.	Server
--	--	---	--------

The GotAPI Server SHALL serialize the data structure above as a JSON formatted stream (i.e. JSON string), then send it to the originating application on the GotAPI-5 (WebSocket connection).

Example of the response

```
{
  "product": "ABCConnect",
  "version": "1.0",
  "result" : 0,
  "hmac"   : "0123456789"
}
```

Appendix A. Change History

(Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS- Weight_Scale_Body_Composition_Analyzer_ APIs-V1_0-20180724-A	24 Jul 2018	Status changed to Approved by CD Doc Ref # OMA-CD-2018-0005-INP_DWAPI_V1_0_ERP_for_final_Approval