



Beringar API

Beringar

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1 Introduction

Preliminary usage notes for Beringar API. In summary the API is:

- REST based.
 - With OpenAPI/Swagger definitions, and demo pages for each call.
 - Only minimal API currently exposed to 3rd parties, with focus on simplicity.
 - Currently only supports GET operations over HTTPS.
- Some of the API calls are in beta and will change.
 - See the key changes section.
- Authentication is currently HTTP basic authentication secured over HTTPS.
 - The current API does also support authentication via Java Web Tokens <https://jwt.io> and this is the future direction for the API
- Questions and feedback please to: support@beringar.co.uk

2 Key Concepts

The two key concepts to understand the API are sensor location and managed spaces.

- Every installed sensor is associated with a sensor location.
 - Each sensor location has a unique identifying UUID that will not change.
 - The UUID remains constant when the physical sensor is replaced.
 - All environmental data is referenced to this sensor location, not the underlying device ID.
- The sensor location is part of a hierarchy (of room, building, contract, and customer).
 - While API calls are provided to recover this information hierarchy, this hierarchy structure is subject to change so must only be considered as FYI information.
 - In particular it is planned that the ‘room’ entity will be removed and be replaced by a more flexible entity reflecting open plan offices.
 - The sensor location will, however, be maintained as a key identifier in future versions of the API so all requests for data should use this key.
- A managed space is part or all of the area under a sensor.
 - Examples of managed spaces include desks, and meeting rooms covered by one sensor¹.
 - Managed spaces are associated with a building in the building hierarchy, not with rooms.

¹ We intend that in future managed spaces will be able to aggregate together data from multiple sensors.

3 Key Changes

Existing users please review the following changes with care.

3.1.1 API Version 1.6

All the calls (except the calls to read the historic sensor and managed space readings) are no longer in beta.

Please use the revised URL replacing **‘/api/beta/...’ with ‘/api/...’** as documented in the swagger page. The older beta URL’s will remain providing the same functionality for this release but will be removed in the future.

This new version of the API introduces two new calls for users wishing to implement their own displays the latest sensor and managed space data. These calls provide all the latest sensor and managed space data respectively for a building each in one round trip from the same latest readings cache used by Beringar’s own dashboard. These calls are documented below and online as:

**/api/sensorreading/latest/building/{building_uuid}
/api/managedspace/latest/building/{building_uuid}**

The remaining calls to fetch a time series of data for sensors and managed spaces continue functionally unchanged as:

**/api/beta/sensorreading/sensorlocation/{sensor_location }/after/{timestamp}
/api/beta/managedspace/spacelocation/{space_location}/after/{timestamp}**

Note:

1. These time series API should only be called periodically (e.g. daily) to synchronize data with an external database.
2. These calls are not intended to be used in near real time to recover the latest sensor readings.
3. These calls remain in beta and are expected to change as we are reviewing providing a revised API for the historic data (with an initial focus on the managed space data).
4. If you have a reason to want to call this API with a high frequency for the same sensor, please contact Beringar.

We are deprecating one call:

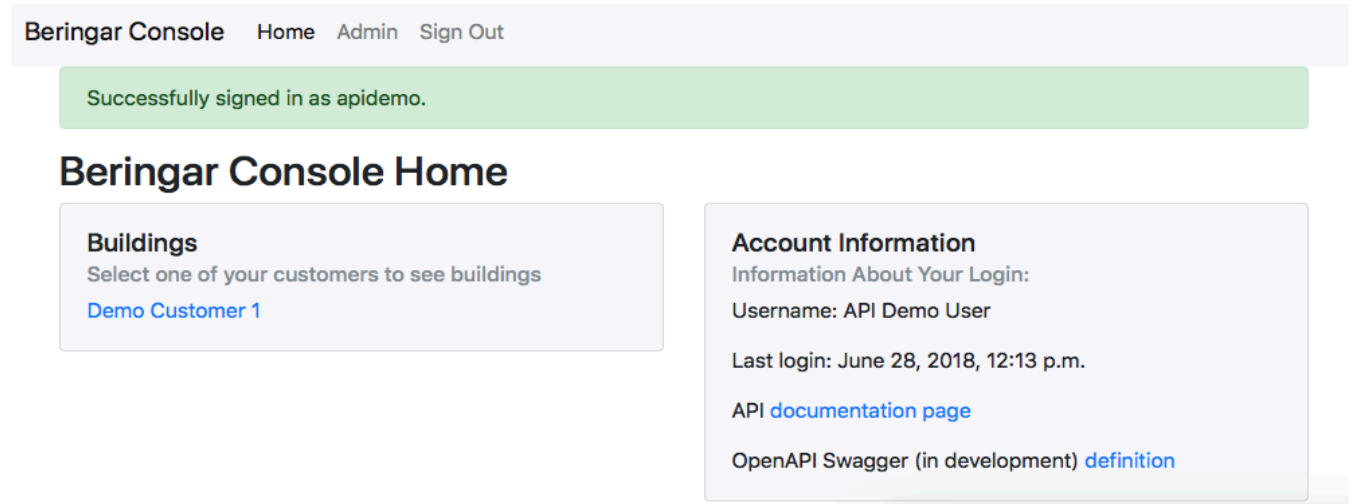
/api/beta/sensorreading/sensorlocation/{sensor_location_uuid}/last/{max_rows}

The API call for the last N readings is deprecated and will be replaced with the latest reading API call. This functionality is available much more efficiently in bulk for a building via the new calls added in this release.

We will consult with historical users of the deprecated calls to determine how long the old and new calls are supported in parallel.

4 API Call Definitions

To view the latest interface simply login to: <https://console.beringar.co.uk/> . You will see the following page (note the layout of this page may be slightly different):



The screenshot shows the Beringar Console Home page. At the top is a navigation bar with links: Beringar Console, Home, Admin, and Sign Out. Below this is a green success message: "Successfully signed in as apidemo." The main heading is "Beringar Console Home". There are two main sections: "Buildings" and "Account Information". The "Buildings" section has a sub-heading "Select one of your customers to see buildings" and a link "Demo Customer 1". The "Account Information" section has a sub-heading "Information About Your Login:" and displays "Username: API Demo User" and "Last login: June 28, 2018, 12:13 p.m.". At the bottom of the "Account Information" section are two links: "API documentation page" and "OpenAPI Swagger (in development) definition".

On the above page follow the link to the *API documentation page*, and you will get a page similar to the next page, where you can make test calls to the API and view the results.

If you do not see the API links, your account does not have API access enabled, please contact Beringar.

building



GET /api/beta/building/ Public - Get all buildings associated with your account

contract



GET /api/beta/contract/ Public - Get all contracts associated with your account

customer



GET /api/beta/customer/ Public - Get all customers associated with your account

managespace



GET /api/beta/managespace/building/{building_uuid}/ Public - Get all managed spaces associated with a building

GET /api/beta/managespace/latest/building/{building_uuid} Latest managed space readings for building

GET /api/beta/managespace/spacelocation/{managed_space_location_uuid}/after/{timestamp_epoch_millisec} Public - Get last 'max_rows' of managed space readings for a given managed space UUID. Note 'max_rows' <= 1000.

room



GET /api/beta/room/ Public - Get all rooms associated with your account

sensorlocation



GET /api/beta/sensorlocation/ Public - Get all sensor locations associated with your account

sensorreading



GET /api/beta/sensorreading/latest/building/{building_uuid}

GET /api/beta/sensorreading/sensorlocation/{sensor_location_uuid}/after/{timestamp_epoch_millisec} Public - Get last 'max_rows' of sensor readings for a given sensor location UUID. Note 'max_rows' <= 1000.

GET /api/beta/sensorreading/sensorlocation/{sensor_location_uuid}/last/{max_rows} DEPRICATED Public - Get last 'max_rows' of sensor readings for a given sensor location UUID. Note 'max_rows' <= 1000.

Note from this page you can exercise the API calls. Pressing the ‘get’ button followed by the ‘try it out’ button will show a screen similar to the following where you can enter the required parameters (if necessary) and see the response.

sensorreading

GET /api/sensorreading/latest/building/{building_uuid}

Parameters

Cancel

Name	Description
building_uuid * required string (path)	<input type="text" value="building_uuid"/>

Execute

Clear

Responses

Response content type **application/json** ▼

5 Sensor Locations

For simple use only two calls are typically used to get sensor locations and then the data associated with each sensor location.

Note, in the following examples **apidemo:hsw-9yW-pTs-psq** should be replaced by your username and password.

Also, the sensor location (**c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f** in the following examples) should be replaced by a sensor location returned in the ‘get sensor locations’ call below.

Note that both the username and password are encrypted as part of the HTTPS request.

5.1 Get Sensor Locations

First list all of the Sensor Locations associated with your login:

```
curl -u apidemo:hsw-9yW-pTs-psq \
"https://console.beringar.co.uk/api/sensorlocation/" \
-H "accept: application/json"
```

In this example there is only one sensor location, response reformatted for readability:

```
[
  {
    "id": "c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f",
    "room": "27b937b7-261e-4033-b6a8-a88b5cbff1ad",
    "name": "Ceiling",
    "roomname": "Demo Room 1",
    "buildingname": "Demo Building 1"
  }
]
```

The 'id' of c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f is the permanent Sensor Location, and is used in subsequent calls.

5.1.1 Sensor Locations Data Dictionary

	Description	Type
id	Beringar database Id of sensor location associated with device sending readings. Corresponds with the 'sensorlocationcurrent' value in the sensor readings data.	UUID
room	Id of Room containing Sensor Location (DEPRECATED – please ignore, rooms will be removed from the system in the future)	UUID
name	Name of Sensor location	String
roomname	Name of Room containing Sensor Location (DEPRECATED – please ignore)	String
buildingname	Name of Building containing Sensor Location	String

5.2 Get Latest Sensor Data

A single call will get the latest sensor data for a building in one round trip.

```
curl -u apidemo:hsw-9yW-pTs-psq \
"/api/sensorreading/latest/building/c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f/" \
-H "accept: application/json"
```

Sample output, in this case there are only two sensors:

```
[
  {
    "timestamputc": "2019-10-10T14:47:03.882000Z",
    "sensorlocation": "c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f",
    "voc": 33,
    "co2": 617,
    "pressure": 1005,
    "humid": 22.5,
    "lux": 43,
    "noise": 41,
    "temperature": 22.12,
    "occupancy": 0
  },
  {
    "timestamputc": "2019-10-10T14:35:40.249000Z",
    "sensorlocation": "da03d967-0415-4b50-bbbb-5e2cfe0cfc1d",
    "voc": 15,
    "co2": 502,
    "pressure": 1005,
    "humid": 23,
    "lux": 19,
    "noise": 40,
    "temperature": 20.5,
    "occupancy": 0
  }
]
```

5.2.1 Sensor Readings Data Dictionary

	Description	Type
rxtimestamputc	Timestamp when data received from network in UTC time zone.	String (ISO 8601)
rxepochmillisec	Millisecond since Unix epoch (01/01/1970) of time when data received from network (DEPRECATED - this is a convenience value used by some client programs, 3 rd party integrations should use the rxtimestamputc value).	Big Integer
device	Beringar database id of physical device sending readings. This does not directly correspond to the device MAC address and should NOT be used as the key to associate together data from the same location. This value should only be used to detect if the sensor	UUID ²

² https://en.wikipedia.org/wiki/Universally_unique_identifier

	has been replaced. This value is only provided in calls providing historic data, not the latest data.	
sensorlocationcurrent / sensorlocation	<p>Beringar database Id of sensor location associated with device sending readings. External systems should use this value as the key to associate together readings from one sensor location, even if the sensor hardware is changed. This value can be used to join with other Beringar data (e.g. the get sensor locations call) to get human readable sensor location information.</p> <p>Note older calls return the value tagged as sensorlocationcurrent, newer calls return sensorlocation.</p>	UUID
occupancy	<p>Estimate of number of people within sensor range of device.</p> <p>Note people may be omitted from count if they are in areas masked out by the sensor to reduce reflections, or may be missed if the one person masks another by line of sight from the sensor.</p> <p>May be reported as 'null' (or omitted) if no data recently received from the occupancy sensor. In CSV dumped data 'null' typically represented as an empty cell (two consecutive comma).</p>	Integer (nullable)
voc	Concentration of Volatile Organic Compounds in the atmosphere. Gives a measure of air quality. Initially this should be used for trend analysis, rather than absolute values	Integer
co2	eCO2 measure for concentration of CO2 in the atmosphere. Gives a measure of air quality. Initially this should be used for trend analysis, rather than absolute values	Integer
temperature	Degrees Celsius. Note in rooms with air conditioning this can vary across the height of a room. Calibration may be necessary	Float
pressure	Atmospheric pressure mBar	Integer
humidity	Relative Humidity %	Integer
lux	Light level. Initially this should be used for trend analysis, rather than absolute values	Integer
noise	Local Noise level (dB).	Integer

5.3 Get Historic Sensor Data

Note: This call is intended for occasional use to synchronize historic data between data stores. The call remains in beta it may change in the future.

In many cases you may wish to download all of the data associated with a sensor location, and then periodically incrementally download new data.

Use the call:

/api/beta/sensorreading/sensorlocation/{sensor_location}/after/{timestamp_epoch_millisec}

to page through all of the saved data for a sensor:

```
curl -u apidemo:hsw-9yW-pTs-psq \
"https://console.beringar.co.uk/api/beta/sensorreading/sensorlocation/c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f/after/0" \
-H "accept: application/json"
```

To read all of the data stored for a sensor location use an initial value of '0' for 'timestamp', this will return a page of results, depending on system configuration this is typically between 100 and 1000 rows.

Then repeat the call with 'timestamp_epoch_millisec' set to the highest value of 'rxepochmillisec' seen in the previous API call to return subsequent pages until a reply with no rows of data is received. Do not assume that the values returned by the API within a page of data will be sorted by time.

The same process can be used to recover data from a point in time by specifying your own value of 'timestamp_epoch_millisec', see <https://currentmillis.com> for details how to generate this value in many different programming languages.

The value 'timestamp_epoch_millisec' is expected to be an integer, dates and times in string format are not accepted.

Exactly the same process is used to page through data for a managed space as documented later.

6 Managed Spaces

Reading managed spaces is undertaken in three parts, get the building id, then a list of the managed spaces, finally data for a managed space.

6.1 Get Building

First list all of the buildings associated with your login:

```
curl -u apidemo:hsw-9yW-pTs-psq \
"https://console.beringar.co.uk/api/building/" \
-H "accept: application/json"
```

In this example there is only one building, response reformatted for readability:

```
[
  {
    "id": "312adf74-3f16-4bbb-a7b2-1ff12d5e594c",
    "contract": "14be7432-6a6f-4a37-9d3c-e9e956db1fa1",
    "name": "York House",
    "postaladdress": "45 Seymour St",
    "postaladdress2": null,
    "city": "London",
    "region": null,
    "postcode": "W1H 7JT",
    "country": "GB",
  }
]
```

The 'id' of 312adf74-3f16-4bbb-a7b2-1ff12d5e594c is the permanent Building Id, and is used in subsequent calls.

Any other fields not listed in above example above should be ignored.

6.1.1 Building Data Dictionary

	Description	Type
id	Permanent ID of the building.	UUID
contract	Permanent ID of the Beringar contract associated with this building.	UUID
name	Building name.	String
postal address, postal address2, city, region, postcode, country	Building address information. Any of these fields may missing or be null if not set.	String

6.2 Get Managed Spaces

First list all of the Managed Spaces associated with a building:

```
curl -u apidemo:hsw-9yW-pTs-psq \
  "https://console.beringar.co.uk/api/managedspace/building/312adf74-3f16-4bbb-a7b2-1ff12d5e594c/" \
  -H "accept: application/json"
```

In this example there are two managed spaces in the building, response reformatted for readability:

```
[
  {
    "id": "876ee499-8a54-4aad-9d79-91d06505918f",
    "name": "Meeting-Room-3.1",
    "floornumber": 3
  },
  {
    "id": "dc0a4d50-af3c-43da-b4db-b98324e26543",
    "name": "Meeting-Room-3.2",
    "floornumber": 3
  },
]
```

In the example above there are only two managed spaces in a building, it is not unusual for there to be 100s of managed spaces in a building.

Any other fields not listed in above example above should be ignored.

6.2.1 Managed Space Data Dictionary

	Description	Type
id	Permanent id of the managed space.	UUID
name	Managed space name	String
floornumber	Floor number. May be negative. Convention for ground floor typically set by customer providing data (i.e. ground floor might be 0 or 1). May be negative.	Integer

6.3 Get Latest Managed Space Data

Gets latest managed space data for all of the managed spaces in a building where data has been received.

```
curl -u apidemo:hsW-9yW-pTs-psq \
  "https://console.beringar.co.uk/api/managedspace/latest/building/c39d6ad1-7b8f-47aa-ada8-
  ce56f082fd9f/" \
  -H "accept: application/json"
```

Sample output, in this case there are only two managed spaces:

```
[
  {
    "timestamputc": "2019-10-10T14:47:03.882000Z",
    "managedspace": "876ee499-8a54-4aad-9d79-91d06505918f",
    "occupancy": 0
  },
  {
    "timestamputc": "2019-10-10T14:35:40.249000Z",
    "managedspace": "df0d5f07-45b4-4986-8611-6c636d2da025",
    "occupancy": 1
  }
]
```

Note no data is returned for a managed space that has been provisioned, but the associated sensor is not installed.

6.3.1 Managed Space Readings Data Dictionary

	Description	Type
rxtimestamputc	As sensor readings.	String (ISO 8601)
rxepochmillisec	As sensor readings (DEPRECATED).	Big Integer
managedspace	Id of the managed space.	UUID ³
occupancy	<p>Estimate of number of people within a managed space. Where managed spaces overlap on the same sensor a person will only be reported in the managed space whose center is closest to that person.</p> <p>As before, note people may be omitted from count if they are in areas masked out by the sensor to reduce reflections, or may be missed if the one person masks another by line of sight from the sensor.</p> <p>Null if present should be interpreted as zero.</p>	Integer (nullable)

³ https://en.wikipedia.org/wiki/Universally_unique_identifier

6.4 Get Historical Managed Space Data

Notes:

1. *This call is intended for occasional use to synchronize historic data between data stores.*
2. *We are aware that this call generates large volumes of data, and this call will change in the future.*

Fetch the data for one managed space by using the call below. This will get the first page of oldest data for the managed space (see FAQ below to page through data):

```
curl -u apidemo:hsw-9yW-pTs-psq \
https://console.beringar.co.uk/api/beta/managedspace/spacelocation/876ee499-8a54-4aad-9d79-91d06505918f/after/0 \
-H "accept: application/json"
```

In this example there are only 2 readings, response reformatted for readability:

```
[
  {
    "rxtimestamputc": "2019-07-02T09:03:04.965000Z",
    "rxepochmillisec": 1562058184965,
    "managedspace": "876ee499-8a54-4aad-9d79-91d06505918f",
    "occupancy": 7
  },
  {
    "rxtimestamputc": "2019-07-02T09:04:04.946000Z",
    "rxepochmillisec": 1562058244946,
    "managedspace": "876ee499-8a54-4aad-9d79-91d06505918f",
    "occupancy": 5
  },
]
```

Above are two sample readings. Please refer to the data dictionary in earlier sections for explanations of the fields.

Note that the occupancy values are directly as seen by the managed space. Delayed data features (e.g. used to display yellow markers on the dashboard) are not included. If you wish to determine if a desk has been occupied in the last 15 min you must review the recent managed space values over that period.

There is no call to get historical data for multiple managed spaces in the same API call.

7 Deprecated Calls

The following is documented here for historical reasons, should not be used, and will be removed shortly.

7.1 View Last N Sensor Readings at a location

For example, to view the last 10 sensor readings for a location

```
curl -u apidemo:hsw-9yW-pTs-psq \
"https://console.beringar.co.uk/api/beta/sensorreading/sensorlocation/c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f/last/10" \
-H "accept: application/json"
```

Note that there is an upper limit on the number of rows returned, currently 100 (check Swagger web documentation for latest limit). If more than the limit number rows are requested, then the limit number of rows are returned (no error is generated).

In this example case there are only two readings:

```
[
  {
    "rxtimestamputc":"2018-01-01T00:00:10Z",
    "rxepochmillisec":1514764810000,
    "device":"bd9d0329-b51f-48ff-8217-ca93e439572a",
    "sensorlocationcurrent":"c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f",
    "occupancy":1,
    "voc":234,
    "co2":12,
    "temperature":21.0,
    "pressure":998,
    "humidity":80,
    "lux":30,
    "noise":12
  },{
    "rxtimestamputc":"2018-01-01T00:00:00Z",
    "rxepochmillisec":1514764800000,
    "device":"bd9d0329-b51f-48ff-8217-ca93e439572a",
    "sensorlocationcurrent":"c39d6ad1-7b8f-47aa-ada8-ce56f082fd9f",
    "occupancy":1,
    "voc":10,
    "co2":23,
    "temperature":17.0,
    "pressure":1023,
    "humidity":80,
    "lux":23,
    "noise":12
  }
]
```

Notes:

1. Set the count above to 1 for the most recent reading only.
2. The two timestamps are equivalent, the epoch value is provided as a convenience.
3. Additional data values may be returned in the API calls, these values should be ignored.

8 Document History

Version	Date	Changes
1.5		Initial customer release.
1.6	2 Nov 2019	Added 'latest' data for building calls. Most calls no longer beta.