

Intellifi Smartspot Quickstart User Guide

Version 2.7



Precautions



Note: before operation please take notice of the regulatory compliance statement and the available antennas section in order to make sure to comply to local regulations.

- When using external antennas, like on the Smartspot Multi-8, installation of this product must be performed by a qualified installation partner
- Do not expose the products to rain or moisture
- There are no user serviceable parts inside, refer all servicing to qualified service personnel

This quick-start document provides an overview of the Intellifi solution, how to set it up and how to use it.

1 Overview

- The Intellifi solution
- Brain services

2 Connecting

- What do you need
- How to connect

3 Working with the system

- Checking connectivity
- Application examples
- Introduction to Brain web API

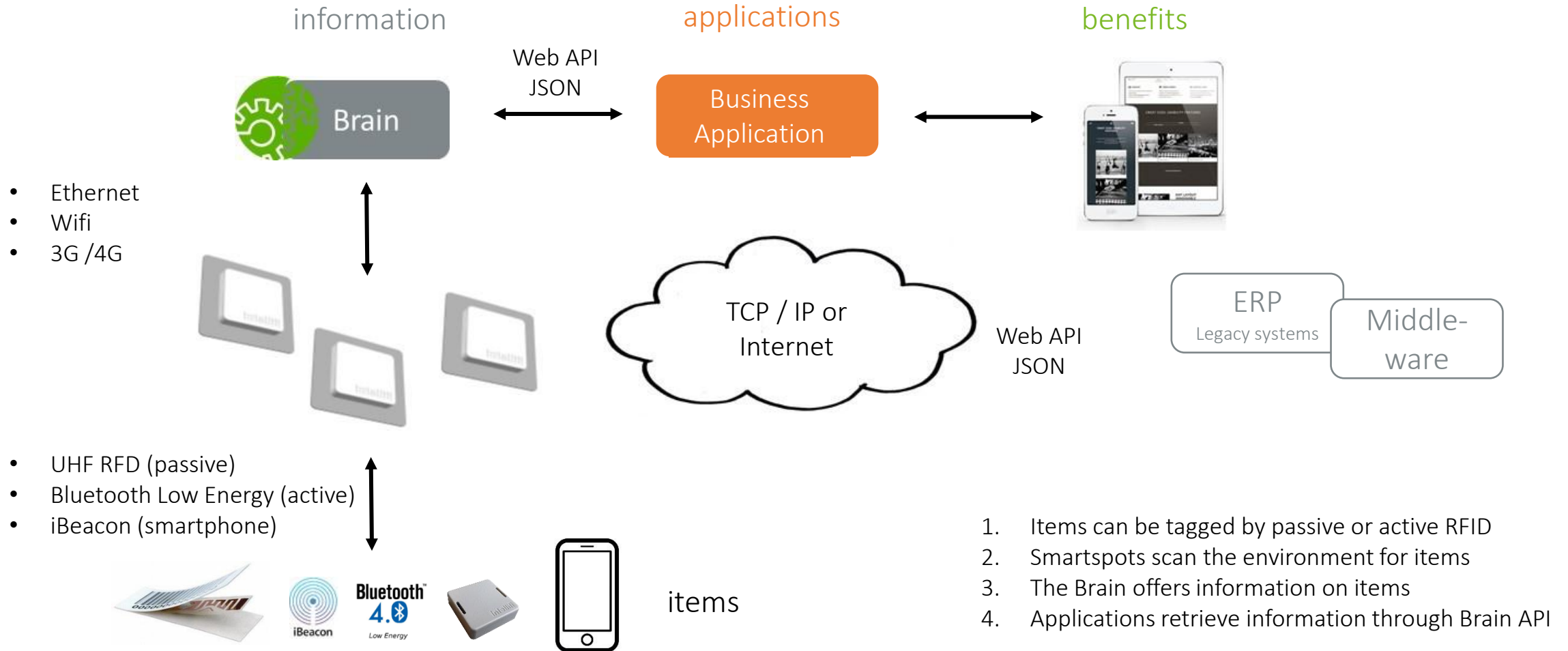
4 Appendices

- Advanced Brain web API services
- Link to full specification
- Regulatory compliance statement
- Available Antennas



Before operation please take notice of the regulatory compliance statement and the available antennas section

The Intellifi solution - Products and technology | beneficial to you.

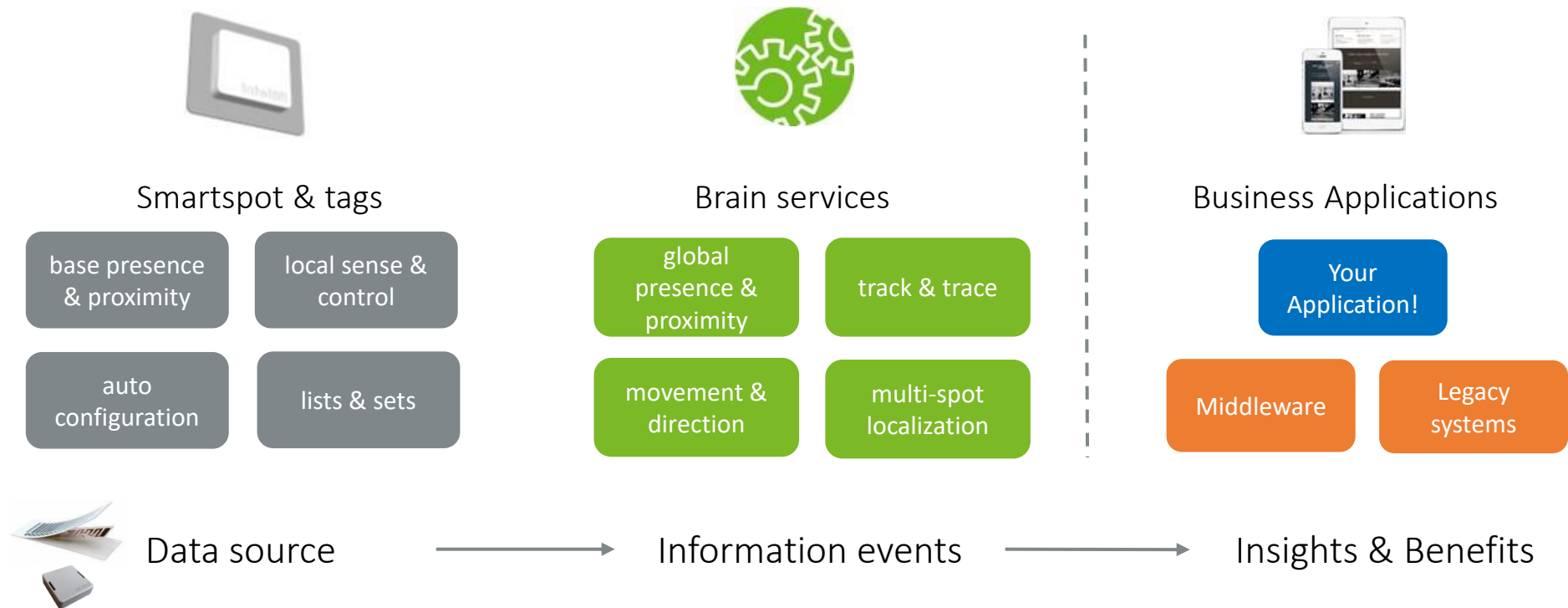


- Ethernet
- Wifi
- 3G /4G

- UHF RFD (passive)
- Bluetooth Low Energy (active)
- iBeacon (smartphone)

1. Items can be tagged by passive or active RFID
2. Smartspots scan the environment for items
3. The Brain offers information on items
4. Applications retrieve information through Brain API

You are supported by Brain services to make application integration as easy as possible.



Intellifi provides the platform with smart products & Brain information services

Application & user interface giving business benefits

To get your Smartspot connected, you need power, Internet connectivity and some tags



1 Intellifi Smartspot

- You may have a regular Smartspot, a Smartspot Tile, a Smartspot multi-8 or a Smartspot BLE.



2 Power

- All Smartspots support Power over Ethernet (this is the preferred way of powering) and come with an external 110V/230V power supply for convenience.



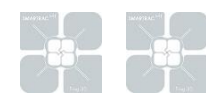
3 Internet connectivity

- Spots need Internet connectivity to connect to the cloud Brain



4 Tags

- You'll need a couple RFID tags or BLE tags to check that things are running well.



Connect and power the Smartspot according to the steps below.



Note: before operation please take notice of the regulatory compliance statement and the approved antennas section in order to make sure to comply to local regulations.

1

Connect the Ethernet port of the Intellifi Smartspot to an Ethernet cable with Internet connectivity

2

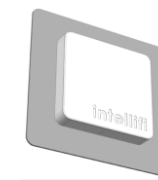
Connect power to the smart spot using the power supply

- You may also provide power using Power over Ethernet (PoE) if available.
- The Smartspots provide a short 3-tone beep during startup.
- Most likely a spot will immediately download the latest firmware and restart again and there will be another 3-tone beep as confirmation.

3

Browse with a PC or tablet to <https://brain.intellifi.nl>

- Login with the demo account:
- Username: demo@Intellifi.nl
- Password: demo



Smartspot Ethernet to Internet

Smartspot power (110-230AC)

Smartspot are plug and play

- Automatic IP configuration (DHCP)
- Automatic antenna detection at startup
- Automatic connect to the Cloud Brain



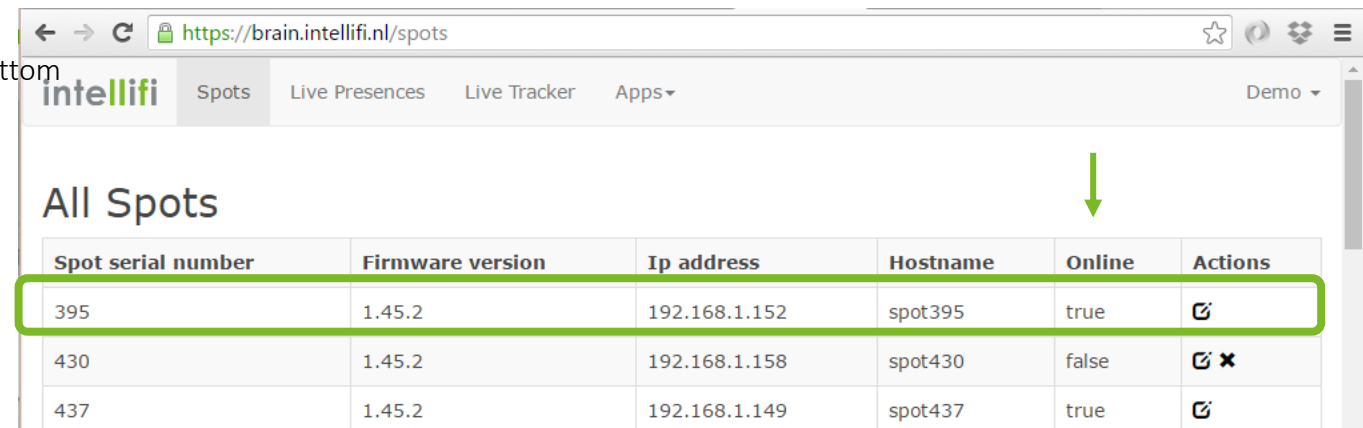
Access to information via
<https://brain.intellifi.nl>

Check connectivity of your spots at the Cloud Brain

- Login to the cloud Brain.
 - Once you are logged in, you can easily check the status and readings online.
 - Once you are logged in, you can also access the API from the same browser without using the API key.
- Check whether your spot has found a connection to the Cloud Brain and is online.
 - <https://brain.intellifi.nl/spots>
 - Use your spot ID (e.g. 395) as a reference
 - Note that the ID of your spot is on the sticker on the bottom side of the spot

- You may see other spots that are connected to the same Cloud Brain sever as well.
 - The brain.intellifi.nl is a public cloud brain
 - You can use this for testing and development purposes.
 - Once you go to deployment, you'll likely choose for a private cloud Brain.

true



Spot serial number	Firmware version	Ip address	Hostname	Online	Actions
395	1.45.2	192.168.1.152	spot395	true	🔗
430	1.45.2	192.168.1.158	spot430	false	🔗 ✕
437	1.45.2	192.168.1.149	spot437	true	🔗

There's a couple of application examples that can be used to check the system.

- The Cloud Brain comes with example apps:
 - *Live Presences* app shows live presences and proximities.
 - 'Immediate' is closest, then 'near' and 'far' is furthest away.
 - You can easily check basic operations with this app.
 - You can quickly filter for a specific spot by clicking the spot in the *Location* column.
 - Check: if the system is running well your tag(s) should show up here

- Tips:
 - By clicking the *Proximity field* the proximity of the given tag is visualized.
 - You can filter for specific tags, spot locations or technology (RFID or BLE) by using the filter menu.

Click to Filter quickly

Location	Item	Proximity
spot389	f7826da64fa24e98f9a9109b	far
spot389	f59ee37fb816402c00010026	far
spot389	0989	near
spot389	0987	near
spot389	0998	far
spot389	f59ee37fb816402c00010019	far
spot389	0990	near
spot389	0988	near
spot389	0999	near

Current filter: spot389

Location	Item	Proximity
spot389	0000000000000000000000003987	near

Brain web API is JSON based. The API supports pulling and pushing technologies. Examples are based on pulling

Brain API

- Brain API is JSON based
 - Fully open
 - According to latest web technology standards
- Supports both:
 - Pulling
 - Pushing (Web-hooks, Socket-IO) allow to subscribe to relevant events
- API Security
 - HTTPS, API-keys
- Find full specification at:
 - <https://github.com/intellifi-nl/webapi-doc>

! Before starting:

- It's highly recommended to install a JSON viewer in your browser (preferably Chrome) for improved human readability of API output.
- The 'JSONView' extension for Chrome works fine for this.

The API presents a couple of web resources; one of them is *presences* resource.

The *Presences* resource

- By calling the *presences* service from your App or from a browser you can easily receive all presences and proximities from the system
 - <https://brain.intellifi.nl/api/presences?populate=item,location>
 - Shows all active presences on this system (Brain), expanding the item details and locations by using the the populate keyword.
- To filter the presences list for a specific location, use:
 - <https://brain.intellifi.nl/api/presences?populate=item,location&location=55dc01805382790533d3d581>
 - You can find the location ID for your spot by looking in the locations resource and filter for your spot label, e.g. for spot 389: <https://brain.intellifi.nl/api/locations?label=spot389>

```
url: "https://brain.intellifi.nl/api/locations?label=spot389",
query_duration_ms: 4,
time_now: "2016-04-05T08:35:20.405Z",
count: 1,
count_current: 1,
is_limited: false,
next_url: null,
- results: [
  - {
    url: "https://brain.intellifi.nl/api/locations/55dc01805382790533d3d581",
    id: "55dc01805382790533d3d581",
    label: "spot389",
    - custom: {
      autogenerated_for: "spot389"
    },
    time_created: "2015-08-25T05:47:44.636Z",
    time_updated: "2015-08-25T05:47:44.636Z"
```

```
url: "https://brain.intellifi.nl/api/presences?populate=item,location",
query_duration_ms: 75,
time_now: "2016-04-05T09:00:18.459Z",
count: 237,
count_current: 100,
is_limited: true,
next_url: "https://brain.intellifi.nl/api/presences?populate=item%2Clocation&before_id=57037ea2f18c7d315e31a6e6",
- results: [
  - {
    url: "https://brain.intellifi.nl/api/presences/57037ea2f18c7d315e31a840",
    id: "57037ea2f18c7d315e31a840",
    - item: {
      url: "https://brain.intellifi.nl/api/items/570371a08be92f585caccf7d",
      id: "570371a08be92f585caccf7d",
      code_hex: "e2009a6030031af000002020",
      technology: "EPC Gen2",
      label: "",
      custom: null,
      set_urls: "",
      is_present: true,
      location_url: "https://brain.intellifi.nl/api/locations/5593bbb0538279055beb45fe",
      move_count: 117,
      time_moved: "2016-04-05T08:54:03.558Z",
      time_created: "2016-04-05T08:04:48.308Z",
      time_updated: "2016-04-05T09:00:15.108Z"
    },
    - location: {
      url: "https://brain.intellifi.nl/api/locations/55c9b1fa538279370e5a6304",
      id: "55c9b1fa538279370e5a6304",
      label: "spot395",
      - custom: {
        autogenerated_for: "spot395"
      },
      time_created: "2015-08-11T08:27:38.140Z",
      time_updated: "2015-08-11T08:27:38.140Z"
    },
    proximity: "far",
    time_created: "2016-04-05T09:00:18.401Z",
    time_updated: "2016-04-05T09:00:18.401Z"
  },
  ],
}
```

The *items* resource shows the current status and location of items

You can do a lookup for all items through:

- <https://brain.intellifi.nl/api/items?populate=location>

Or filter for a specific item, e.g. on the epc_code:

- https://brain.intellifi.nl/api/items?populate=location&code_hex=0548

Or filter for Bluetooth technology:

- <https://brain.intellifi.nl/api/items?populate=location&technology=Bluetooth%20LE>

```

← → ↻ 🔒 https://brain.intellifi.nl/api/items?populate=location
{
  url: "https://brain.intellifi.nl/api/items?populate=location",
  query_duration_ms: 57,
  time_now: "2016-04-05T09:21:16.176Z",
  count: 19234,
  count_current: 100,
  is_limited: true,
  next_url: "https://brain.intellifi.nl/api/items?populate=location&before_id=570258ab8be92f585caccf4a",
  - results: [
    - {
      url: "https://brain.intellifi.nl/api/items/570381758be92f585caccfad",
      id: "570381758be92f585caccfad",
      code_hex: "0548",
      technology: "EPC Gen2",
      label: "",
      custom: null,
      set_urls: "",
      is_present: false,
      - location: {
        url: "https://brain.intellifi.nl/api/locations/55dc01805382790533d3d581",
        id: "55dc01805382790533d3d581",
        label: "spot389",
        - custom: {
          autogenerated_for: "spot389"
        },
        time_created: "2015-08-25T05:47:44.636Z",
        time_updated: "2015-08-25T05:47:44.636Z"
      },
      move_count: 1,
      time_moved: "2016-04-05T09:12:31.676Z",
      time_created: "2016-04-05T09:12:21.614Z",
      time_updated: "2016-04-05T09:12:31.676Z"
    },
    - {
      url: "https://brain.intellifi.nl/api/items/570380e38be92f585caccfac",
      id: "570380e38be92f585caccfac",
      code_hex: "e200208395160167236023a4",
      technology: "EPC Gen2",

```

You can use the moves resource to lookup the movement of items from on location to the other.

You can do a lookup of all movements of items by using:

- <https://brain.intellifi.nl/api/items/moves?populate=item.label,location.label>

Or you can filter for a specific item ID:

- https://brain.intellifi.nl/api/items/moves?populate=item.label,location.label&item_id=570372e28be92f585caccf8a

Showing

1. Item labeled "Box 0990" moved, with item ID=57...8a
2. Moved to location "spot389"
3. at time: 2016-04-05T09:45:25
4. from Location "spot315"

1. item →
2. to location →
3. time moved →
4. from location →

```

https://brain.intellifi.nl/api/items/moves?populate=item.label,location.label&item_id=570372e28be92f585caccf8a

{
  url: "https://brain.intellifi.nl/api/items/moves?populate=item.label%2Clocation.label&item_id=570372e28be92f585caccf8a",
  query_duration_ms: 7,
  time_now: "2016-04-05T09:45:29.213Z",
  count: 4,
  count_current: 4,
  is_limited: false,
  next_url: null,
  - results: [
    - {
      url: "https://brain.intellifi.nl/api/events/570389358be92f1104a28a6e",
      id: "570389358be92f1104a28a6e",
      - item: {
        url: "https://brain.intellifi.nl/api/items/570372e28be92f585caccf8a",
        id: "570372e28be92f585caccf8a",
        label: "Box 0990"
      },
      - location: {
        url: "https://brain.intellifi.nl/api/locations/55dc01805382790533d3d581",
        id: "55dc01805382790533d3d581",
        label: "spot389"
      },
      time_moved: "2016-04-05T09:45:25.377Z"
    },
    - {
      url: "https://brain.intellifi.nl/api/events/5703890d8be92f1104a286f7",
      id: "5703890d8be92f1104a286f7",
      - item: {
        url: "https://brain.intellifi.nl/api/items/570372e28be92f585caccf8a",
        id: "570372e28be92f585caccf8a",
        label: "Box 0990"
      },
      - location: {
        url: "https://brain.intellifi.nl/api/locations/568d329ac68a05072b8d0bef",
        id: "568d329ac68a05072b8d0bef",
        label: "spot315"
      },
      time_moved: "2016-04-05T09:44:45.069Z"
    },
  ],
}

```

You can use addition fields to filter the query results. You'll need an API key to access the API from you own application

Filter on date & time

You can filter presences based on time with the 'after' or 'before' (exclusive) and with the 'from' and 'until' (inclusive) keywords

To show all presences on spot389 since 2016-04-01 at the given UTC time:

- <https://brain.intellifi.nl/api/presences?populate=item,location&location=55dc01805382790533d3d581&after=2016-04-01T08:16:53.666Z>

To show all presences fro spot389 since 2016-04-01 at the given UTC time

- <https://brain.intellifi.nl/api/presences?populate=item,location&location=55dc01805382790533d3d581&from=2016-04-01T08:16:53.666Z>

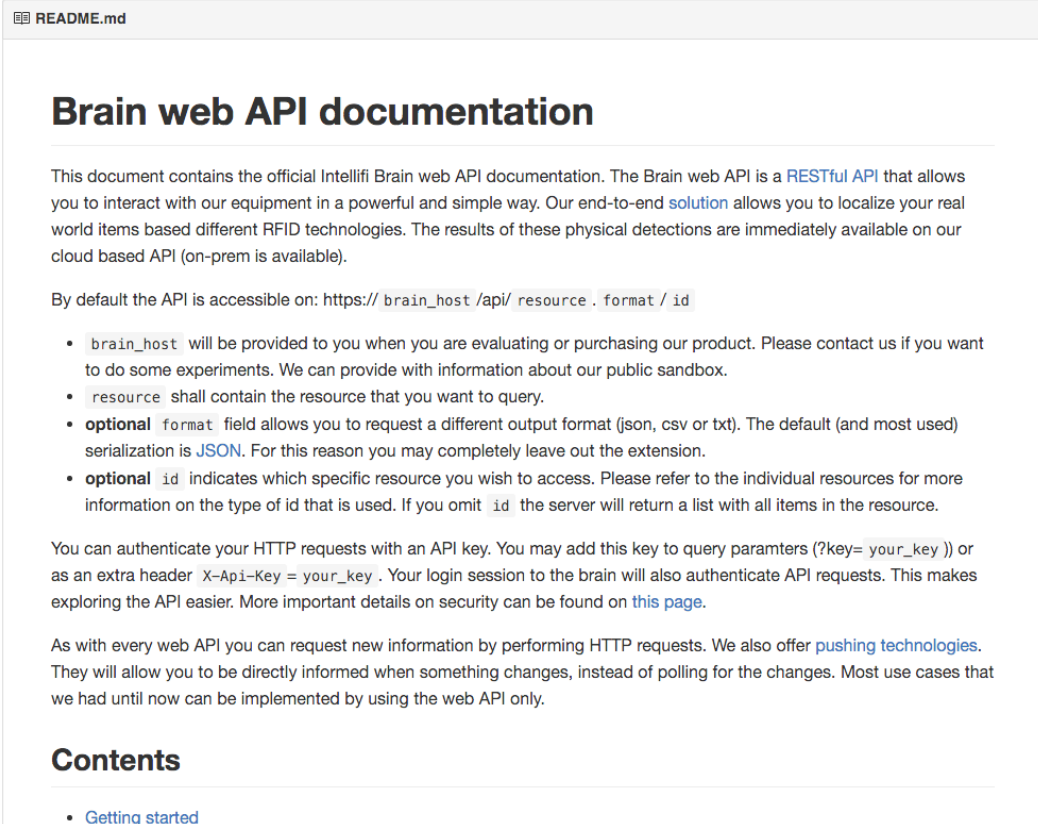
API Key

- To use the Brain API, you need to use an API key.
- On the shared cloud Brain the key is: e22cf86e-f248-42e4-9e4c-ae14a74bd68d
- Example:
 - <https://brain.intellifi.nl/api/items?key=e22cf86e-f248-42e4-9e4c-ae14a74bd68d>

The latest Brain API specification can be found online

Find the full API specification at:

- <https://github.com/intellifi-nl/webapi-doc>



README.md

Brain web API documentation

This document contains the official Intellifi Brain web API documentation. The Brain web API is a [RESTful API](#) that allows you to interact with our equipment in a powerful and simple way. Our end-to-end [solution](#) allows you to localize your real world items based different RFID technologies. The results of these physical detections are immediately available on our cloud based API (on-prem is available).

By default the API is accessible on: `https:// brain_host /api/ resource . format / id`

- `brain_host` will be provided to you when you are evaluating or purchasing our product. Please contact us if you want to do some experiments. We can provide with information about our public sandbox.
- `resource` shall contain the resource that you want to query.
- **optional** `format` field allows you to request a different output format (json, csv or txt). The default (and most used) serialization is [JSON](#). For this reason you may completely leave out the extension.
- **optional** `id` indicates which specific resource you wish to access. Please refer to the individual resources for more information on the type of id that is used. If you omit `id` the server will return a list with all items in the resource.

You can authenticate your HTTP requests with an API key. You may add this key to query parameters (`?key= your_key`) or as an extra header `X-API-Key = your_key`. Your login session to the brain will also authenticate API requests. This makes exploring the API easier. More important details on security can be found on [this page](#).

As with every web API you can request new information by performing HTTP requests. We also offer [pushing technologies](#). They will allow you to be directly informed when something changes, instead of polling for the changes. Most use cases that we had until now can be implemented by using the web API only.

Contents

- [Getting started](#)

FCC Compliance Statement

FCC compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with FCC RF radiation exposure limits for general population, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 23 cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada Compliance Statement

Industry Canada compliance

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

- 1) this device may not cause interference, and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter 22367-SMRTSPT has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than 8.5 dBi, are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To comply with Industry Canada RF radiation exposure limits for general population, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 35 cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

Industrie Canada Conformité

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) l'appareil ne doit pas produire de brouillage;
- 2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Afin de réduire le risque d'interférence avec d'autres utilisateurs, le type d'antenne et son gain doivent être choisis de telle sorte que la puissance isotrope rayonnée équivalente (PIRE) ne soit pas supérieure à celle permise pour une communication réussie.

Cet appareil a été conçu pour fonctionner avec l'antenne (s) énumérées à la section suivante qui ont un gain maximum de 8.5 dB. Antennes pas inclus dans cette liste ou présentant un gain supérieur à 8.5 dB sont strictement interdits pour utilisation avec cet appareil. L'impédance d'antenne requise est de 50 ohms.

La ou les antennes doivent être installées de telle façon qu'une distance de séparation minimum de 35 cm soit maintenue entre le radiateur (antenne) et toute personne à tout moment. Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionnement en association avec une autre antenne ou transmetteur.

Available Antennas

The Smartspots are certified and available with 3 optional antennas. The use of these antennas requires professional installation.

Antennas available to the Smartspot are detected automatically, no software settings needed. Note: the API has a possibility to disable connected antennas, please consult the web API documentation.

Option 1:

Model	Spot Antenna (A14)
Manufacturer	Intellifi
Antenna Description	Patch Antenna
Polarization	dual linear
Frequency range	860 – 930 MHz
Impedance	50 Ohm
Return Loss	> 10 dB
Gain	8.5 dBi

Option 2/FCC:

Model	Micro Antenna 915 MHz (A75)
Manufacturer	Intellifi
Antenna Description	Ceramic Patch Antenna
Polarization	RHCP
Frequency range	902 – 928 MHz
Impedance	50 Ohm
Gain	4 dBic

Option 2/ETSI:

Model	Micro Antenna 866 MHz (A74)
Manufacturer	Intellifi
Antenna Description	Ceramic Patch Antenna
Polarization	RHCP
Frequency range	864 – 868 MHz
Impedance	50 Ohm
Gain	4 dBic

Option 3:

Model	Shelf Antenna (A84)
Manufacturer	Intellifi
Antenna Description	Patch Antenna (2 pcs)
Polarization	dual linear
Frequency range	860 – 930 MHz
Impedance	50 Ohm
Gain	7 dBi