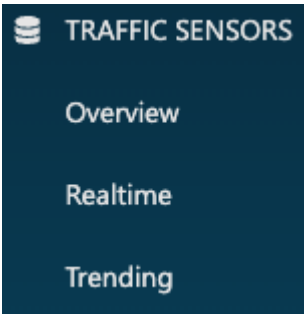


## Introduction to Device Health

This document is intended to help users quickly get started using the Device Health dashboard and assist them in getting answers to many of the common questions they have regarding the health of their IoT devices.



The *EverSmart* dashboard includes a navigation panel on the left and the tab or page contents on the right. The navigation menu in Device Health includes tabs for two ways to look at your data: *Overview*, *Realtime*, and *Trending*.

Each of these tabs can help you answer different questions about your data.

### OVERVIEW

1. What is the overall health of the devices at my site?
2. How do I identify which devices are not reporting data?
3. How do I identify which devices are reporting faults or warnings?
4. How do I identify which devices have battery issues?
5. How do I identify which devices have connectivity issues?
6. How do I download data after applying a filter?
7. Which issues does a specific device have?

### REALTIME

8. What are the latest values reported by my devices?

### TRENDING

9. Which devices had battery issues over a specific time range?
10. What was the voltage for a particular space on a particular date?
11. Which spaces have the highest and lowest data loss over time?

### SENSOR SPECIFIC

12. For Indoor Foot Traffic sensors, how do I view and resolve faults?
13. For Indoor Foot Traffic sensors, how do I view and resolve warnings?

### ADVANCED

14. How do I access and interpret data from my sensors that is categorized as *Advanced*?

## Overview Tab

The *Overview* tab provides real-time device health data and insights. This page includes clickable tiles that help users filter data easily. After applying a filter, you can download a list of all devices that the filter applies to.

The tab includes a table with the following columns:

- **Building / Floor / Room** - your data can be sorted by building, floor, or room by clicking on these column headers. The twinning configuration of your specific site determine the number and naming of these columns, but *Building*, *Floor*, and *Room* are the defaults.
- **Last Seen (GMT) / Last Seen (local) / Last Seen (ago)** – shows the time of the latest retrieved reading for each device – in Greenwich Mean Time, in the local time of the devices, and as a description of ‘how long ago’.

This table also includes sensor specific columns for the various measurements reported by your sensors including one or more of the following columns:

**Voltage** – battery voltage as measured by the device.

voltages below 3.1 V (motion sensors) and 2.2 V (feedback devices) are considered low battery conditions.

**Battery Health** – whether the value for the battery voltage reported by the device is adequate given sensor model.

**Data Loss** – Percentage of expected records which were not received. This is calculated over a window using LoRaWAN packet sequence counter (aka fcnt\_up). A device which is missing more than 20% of its data is considered intermittent. Data loss can be caused by a weak radio connection from the device to the gateway AND / OR a weak cellular connection from the gateway to the network.

### Q1. What is the overall health of the devices at my site?

Device Health evaluates whether each individual device is considered healthy or not.

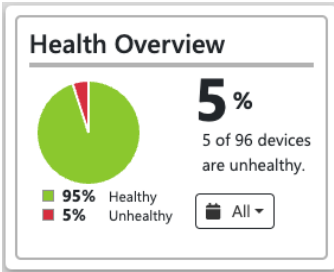
**Healthy** – A device labelled as healthy meets all of the following criteria:

- Has reported data within 24 hours
- Has not reported any faults in the last 24 hours
- Has ‘Very Good’ or ‘Good’ Battery Health
- Has reported at least 80% of the data generated in the last 24 hours

**Unhealthy** – A device labelled as unhealthy meets one or more of the following criteria:

- Has not reported data within 24 hours
- Has reported one or more faults in the last 24 hours
- Has ‘Very Low’ or ‘Low’ Battery Health
- Is missing more than 20% of the data generated in the last 24 hours

In the 'Health Overview' tile, you can see the overall percentages of 'Healthy' and 'Unhealthy' devices in a particular set of devices.



To filter the devices based on their health, select a filter from the 'Health Overview' dropdown. You can select 'All' devices, 'Healthy' devices, or 'Unhealthy' devices. The table underneath will show all devices that match the filter you selected.

Q2. How do I identify which devices are not reporting data?

Click on the tile that reads 'Missing Devices'. The tile will now be highlighted in blue. Below the group of tiles, you will see a table reading 'Missing Devices' that lists all devices that have not reported data within the last 24 hours.

**Missing Devices (2 of 96)** Download

Issues	Building	Floor	Room	Space	DevEUI	Last Seen (GMT)	Last Seen (local)	Last Seen (ago)	Voltage	Battery Health	Data Loss
missing	Metro Center	2nd Floor	Ruth Room	Desk 96	58-A0-CB-00-00-11-59-72	2023-10-05T00:27:28.5Z	10/5/2023, 2:27 AM	1 month ago			
missing	Skyline Tower	2nd Floor	North Hall	Desk 21	58-A0-CB-00-00-11-54-4A						

Q3. How do I identify which devices are reporting faults or warnings?

Click on the tile that reads 'Faults' or the tile that reads 'Warnings'. The tile will now be highlighted in blue. The table below will now list all the devices reporting at least 1 fault or warning respectively in the last 24 hours. Please note that not all sensors report faults / warnings. If your sensor does not report them, you will not see these tiles.

**Health Overview**

83% Healthy  
17% Unhealthy

17 of 98 devices are unhealthy.

All

**Missing Devices**

4% or 4 of 98

Devices not reporting data within the last 24 hours. These devices may be missing, malfunctioning, or have a dead battery.

**Faults**

6% or 6 of 98

Devices reporting faults within the last 24 hours. See Help for information on resolving faults.

**Warnings**

5% or 5 of 98

Devices reporting warnings within the last 24 hours. See Help for information on resolving faults.

Faults (6 of 98)											Download
Issues	Building	Floor	Room	Doorway	DevEUI	Last Seen (GMT)	Last Seen (local)	Last Seen (ago)	Faults	Fault Events	
fault	Horizon Arena	1st Floor	Room 189	Doorway A	00-04-A3-0B-00-FA-CB-70	2023-11-08T21:51:20.409Z	11/8/2023, 10:51 PM	16 minutes ago	190	disturbed	
fault	Horizon Arena	2nd Floor	Room 231	Doorway A	00-04-A3-0B-00-FA-73-DB	2023-11-08T21:52:44.348Z	11/8/2023, 10:52 PM	14 minutes ago	96	disturbed	
fault	Horizon Arena	2nd Floor	Room 232	Doorway A	00-04-A3-0B-00-FB-0B-50	2023-11-08T21:59:15.664Z	11/8/2023, 10:59 PM	8 minutes ago	97	disturbed	
fault	Horizon Arena	3rd Floor	Room 367	Doorway A	00-04-A3-0B-00-EE-7B-49	2023-11-08T21:57:12.194Z	11/8/2023, 10:57 PM	10 minutes ago	186	disturbed	
fault, intermittent	Horizon Arena	3rd Floor	Room 375	Doorway A	00-04-A3-0B-00-FB-67-3A	2023-11-08T21:48:16.759Z	11/8/2023, 10:48 PM	19 minutes ago	78	weak	
fault	Skyline Tower	1st Floor	Summit Suite	Doorway A	00-04-A3-0B-00-ED-EE-5C	2023-11-08T21:58:03.783Z	11/8/2023, 10:58 PM	9 minutes ago	83	weak	

For tips on how to understand and resolve sensor specific faults and warnings, please see the section titled ‘Sensor Specific’ later in this document.

#### Q4. How do I identify which devices have battery issues?

Click on the tile that reads ‘Battery Issues’. The tile will now be highlighted in blue. Below the group of tiles, you will see a table reading ‘Battery Issues’ that lists all the devices with ‘Very Low’ or ‘Low’ battery health. Please note that not all sensors report battery voltage. If your sensor does not report battery voltage, you will not see this tile.

#### Health Overview

**3%**  
3 of 96 devices are unhealthy.

97% Healthy  
3% Unhealthy

All

#### Missing Devices

**2%** or 2 of 96  
Devices not reporting data within the last 24 hours. These devices may be missing, malfunctioning, or have a dead battery.

#### Battery Issues

**1%** or 1 of 96  
Batteries you should replace soon.

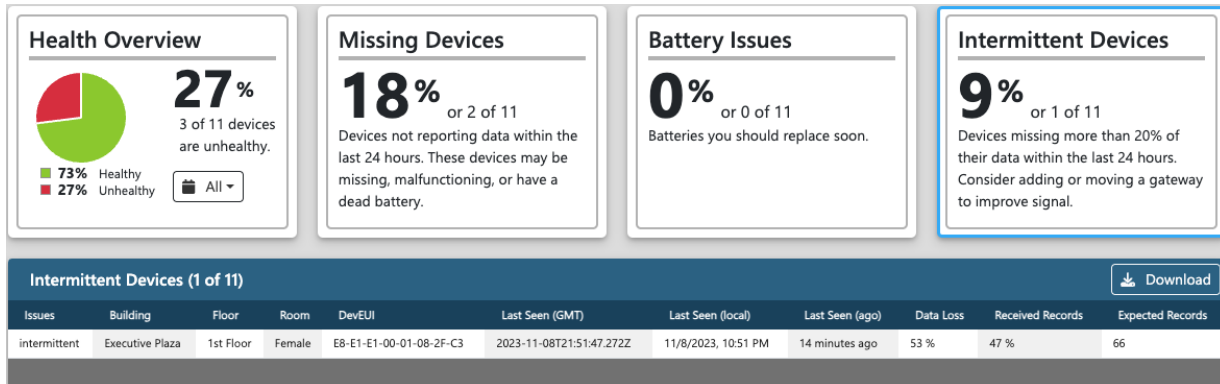
#### Intermittent Devices

**0%** or 0 of 96  
Devices missing more than 20% of their data within the last 24 hours. Consider adding or moving a gateway to improve signal.

Battery Issues (1 of 96)											Download
Issues	Building	Floor	Room	Space	DevEUI	Last Seen (GMT)	Last Seen (local)	Last Seen (ago)	Battery Health	Voltage	
battery	Executive Plaza	2nd Floor	Networking Hub	Desk 73	58-A0-CB-00-00-11-5B-00	2023-11-08T20:47:02.314Z	11/8/2023, 9:47 PM	14 minutes ago	Low	3.5	

#### Q5. How do I identify which devices have connectivity issues?

Click on the tile that reads ‘Intermittent Devices’. The tile will now be highlighted in blue. Below the group of tiles, you will see a table reading ‘Intermittent Devices’ that lists all devices that have reported less than 80% of their data within the last 24 hours. Intermittency is indicative of a connectivity problem. The individual sensor may have a weak connection to the gateway or the gateway may have a weak connection to the cell network. If an unacceptable number of your sensors are reporting intermittency, you may want to resolve the issue by deploying more gateways or by moving existing gateways into locations with better cellular signals. For example, a gateway installed in a sub basement or in a metal cabinet may experience connectivity issues.



Please note that not all sensors report intermittency. If your sensor does not report intermittency, you will not see this tile.

#### Q6. How do I download data after applying a filter?

Filter your data by clicking on one of the tiles, then click the 'Download' button on the table underneath. This will download a csv of all devices that this filter applies to.

#### Q7. Which issues does a specific device have?

The *Overview* tab lists all devices in a particular group by default. In this table there is a column titled 'Issues'. This column lists all the issues a specific device currently has.

- **Missing** – data has not been reporting within the last 24 hours
- **Configuration** – device whose DevEUI is still set to "00-00-00-00-00-00-00"
- **Fault** – device has reported one or more faults in the last 24 hours
- **Battery** – battery health is in the 'Very Low' or 'Low' state
- **Intermittent** – a device with a data loss higher than 20% is considered intermittent

## Realtime Tab

The *Realtime Tab* provides the current status of your site according to the latest readings transmitted from the devices.

#### Q8. What are the latest values reported by my devices?

Click the *Realtime* tab to see all the latest values reported by your devices.

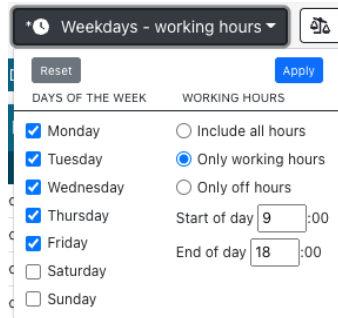
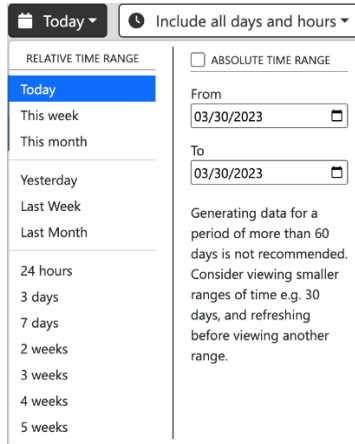
# Trending Tab

The *Trending Tab* visualises how the data in your site’s spaces changes over time. See how the device health at your site has changed over time. In contrast to the *Overview Tab* (which shows the current overall device health across all spaces in your site), the trending tab shows you how a **single field** at a time in your data varies **over time** as well as over space.

The Trending Tab has a range of filters to allow you to refine the display of data:

### Time Range picker

Select a relative time range from the list provided OR specify a custom absolute time range. Once you have picked a time range, the beginning and end of the time range will be displayed below.

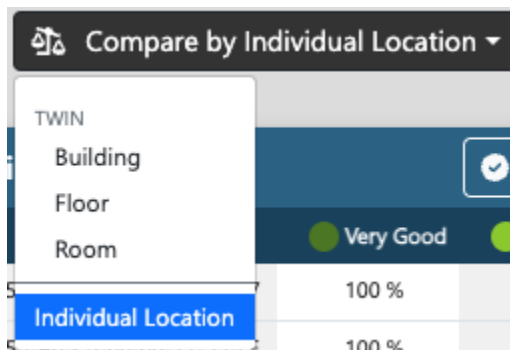


### Day / Hour filter

To filter by days of the week and / or working hours, select the desired settings then click *Apply*.

### Compare by picker

To choose whether to group your data by building, by floor, or simply to graph by individual spaces, select a comparison level from the dropdown list provided. The options provided in this dropdown depend on the twinning configuration of your specific site.



#### Field picker

To choose which field to graph, select the field and the operator (or states). Then click *Apply*.

#### Location filter

To filter the contents of the summary table at the top of the page as well as the rest of the visuals below, select which Building(s), Floor(s) and Room(s) to include then click *Apply*.

The options provided in this dropdown depend on the twinning configuration of your specific site. Using this dialog can help you reduce the table to a more manageable height when you already know which data you are interested in drilling down into.

Note: The *Reset* button clears the selections in the respective dialogs. You will still need to click *Apply* to apply the cleared settings.

To choose exactly which room (or floor or building depending on what you selected in the *Compare by* picker) to graph, check or uncheck the pertinent row(s) in the table immediately under the filters.

If any rows are selected, then all **selected** rows are aggregated together as All Selections in the remaining visuals on this page.

If **NO** rows are selected in the top-most table on this page, then all **visible** spaces are aggregated together as *All Selections* in the remaining visuals on this page. Visible spaces include all rows in the table – all spaces in your configuration **EXCEPT** spaces filtered out by the *Location* filter.

Use the *Select All* button or the *Deselect All* button to select or deselect all rows at once.

Selecting many rows at once may make the visuals harder to read.

Q9. Which devices had battery issues over a specific time range?

On the *Trending* tab use the *Time Range* picker to select a time range. Next in the *Field* dropdown select 'Battery Health' in the FIELD column. Select both 'Very Low' and 'Low' in the STATE column. Then click 'Apply'.

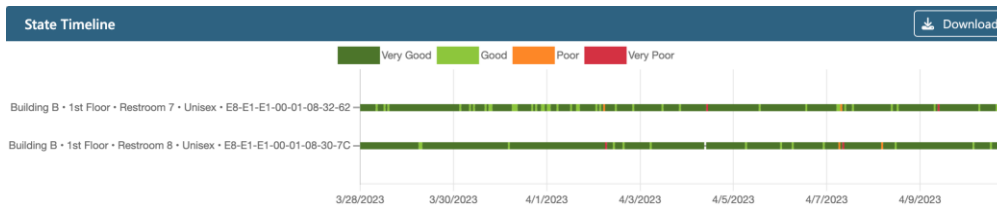
Review the table see how often a particular device reported a 'Very Low' or 'Low' Battery health state

Q10. What was the voltage for a particular space on a particular date?

After you've selected a time range from the date selector, select one or more specific spaces that you want to learn more about by selecting the checkbox to the left of the 'Building' column.

SNR Health by Space (2 selected of 11 visible of 11 total)										Select All	Deselect All	Download
Building	Floor	Room	Space	DevEUI	Very Good	Good	Poor	Very Poor				
<input checked="" type="checkbox"/>	Building B	1st Floor	Restroom 8	Unisex	E8-E1-E1-00-01-08-30-7C	95 %	4 %	1 %	1 %			
<input checked="" type="checkbox"/>	Building B	1st Floor	Restroom 7	Unisex	E8-E1-E1-00-01-08-32-62	87 %	12 %	1 %	1 %			

Now, scroll down to the 'State Timeline' where you can see the Battery Health state over your selected time range.



Q11. Which spaces have the highest and lowest data loss over time?

Select 'Data Loss' from the field dropdown. You can easily sort spaces by field by clicking on the column. Header for that field. It should appear similar to the table below.

Percent Data Loss by Space (0 selected of 98 visible of 98 total)							Select All	Deselect All	Download
Building	Floor	Room	Doorway	DevEUI	Percent Data Loss				
<input type="checkbox"/>	Horizon Arena	3rd Floor	Room 332	Doorway A	00-04-A3-0B-00-FB-2D-3F	18 %			
<input type="checkbox"/>	Horizon Arena	3rd Floor	Room 375	Doorway A	00-04-A3-0B-00-FB-67-3A	14 %			
<input type="checkbox"/>	Horizon Arena	2nd Floor	Room 249	Doorway A	00-04-A3-0B-00-F7-34-F0	14 %			
<input type="checkbox"/>	Horizon Arena	3rd Floor	Room 331	Doorway A	00-04-A3-0B-00-FA-6C-5A	13 %			
<input type="checkbox"/>	Horizon Arena	4th Floor	Room 428	Doorway A	00-04-A3-0B-00-F7-DE-18	11 %			

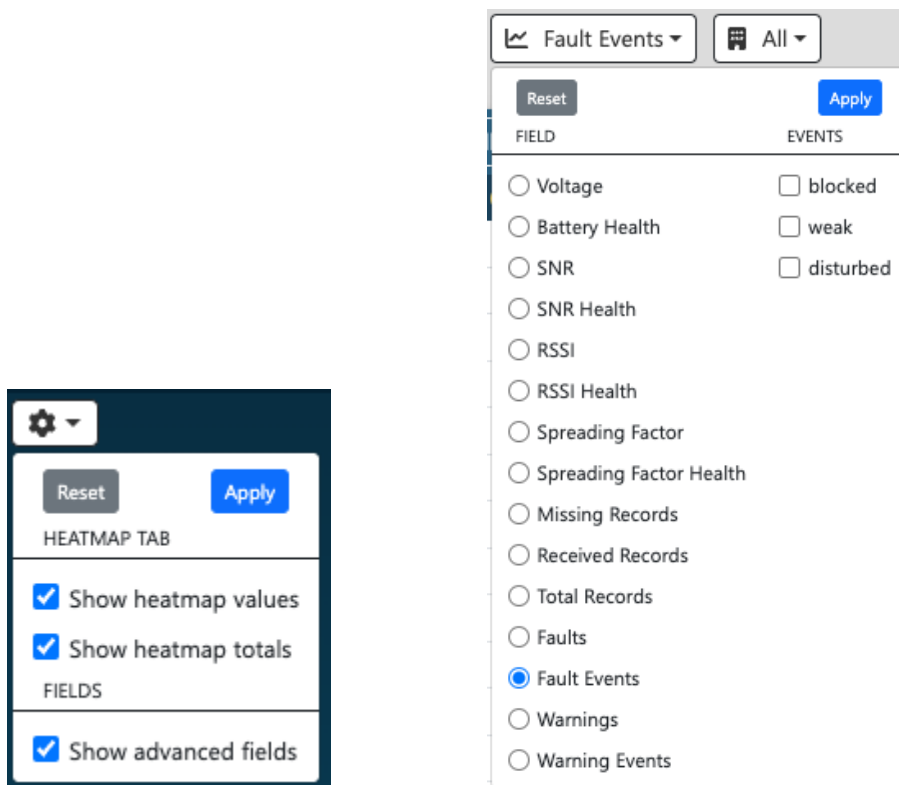


## Sensor Specific

Q12. For Indoor Foot Traffic sensors, how do I view and resolve faults?

The IMBuildings People Counter sensors report fault and warning data. Because the sensors will not report data accurately when faults and warnings are occurring, we recommend turning ON notifications so you will get emailed or texted when faults or warnings occur and can rectify the problem. Reach out to us at [support@microshare.io](mailto:support@microshare.io) to turn on notifications.

You can view details on the faults on the *Trending Tab*. From the *Field* dropdown, choose *Fault Events* and click *Apply*.



### Blocked and Weak

When a sensor reports a pattern of both *blocked* and *weak* faults together, this indicates that the two sides of the sensor are completely blocked from each other for a long period of time. Some typical causes of this

- One or both sides of the sensor have become dislodged from the wall
- A piece of furniture or other object has been placed in between the two sensors
- The sender side of the sensor is out of battery and is no longer sending a signal at all.

Usually the sensor will continue to report data while it is in this state, but this data will appear to show that no traffic is occurring. It is important to address this problem when it occurs.

## Blocked

When a sensor reports *blocked*, without also reporting *weak*, the two sides of the sensor are blocked from communicating with each other for a brief period of time. For example, if a person stands in the door way for several minutes, then the sensor will report a *blocked* fault. This can cause some inaccuracy in the rest of the data for that day as the sensor will not be able to report on any people who enter or leave through the doorway while another person is blocking it.

## Disturbed

When a sensor reports *disturbed*, there is a physical installation or configuration problem where there are multiple IR beams interfering with each other. Some typical causes of this

- Sensors are installed on immediately adjacent doorways so that the receiver side of one sensor “sees” the signal from two sender sides
- Sensors are installed on or adjacent to a reflective background such as a mirrored or glass surface
- An IR beam from an unrelated device such as an automatic doorway is interfering.

If you cannot resolve this issue on your own, please reach out to [support@microshare.io](mailto:support@microshare.io) for assistance.

## Weak

When the sensor reports *weak*, the signal strength is not strong enough and the accuracy may be negatively affected. Some typical causes of this

- One or both sides of the sensor are askew from each other
- The two sides of the sensor are too far apart
- The batteries are running low

If you cannot resolve this issue on your own, please reach out to [support@microshare.io](mailto:support@microshare.io) for assistance.

## Q13. For Indoor Foot Traffic sensors, how do I view and resolve warnings?

You can view details on the warnings on the *Trending Tab*. From the *Field* dropdown, choose *Fault Events* and click *Apply*.

Then from the *Field* dropdown, choose *Warning Events* and click *Apply*.

## Low placed battery or low receiver battery

When a sensor reports these warnings, check and replace the batteries as needed.

## Reconnect

This happens rarely. If a single sensor reports this with any regularity, please contact us at [support@microshare.io](mailto:support@microshare.io).

## Settings changed

This happens rarely. If a single sensor reports this with any regularity, please contact us at [support@microshare.io](mailto:support@microshare.io).

## Advanced

Q14. How do I access and interpret data from my sensors that is categorized as Advanced?

To show *Advanced* fields, click the Gear icon on the upper left of the navigation panel and then turn ON *Show advanced fields*. In *Advanced* mode, you may see some or all the following fields, depending on which sensor you have.

**Received Records** – how many records were received from the sensor during the last 24 hours

**Expected Records** – how many records were expected from the sensor during the last 24 hours

**Signal to Noise Ratio (SNR)** – (device-to-gateway) indicates how much above the ambient noise floor the signal is. For typical indoor deployments, 0 or above is considered good. Negative SNR may lead to more frequent packet loss.

**SNR Health** – a qualitative measurement of whether the value for the SNR reported by the device is adequate.

**Received Signal Strength Indicator RSSI** – (device-to-gateway) - measures the energy that is received. Indicator of how close the device is to the gateway.

**RSSI Health** – a qualitative measurement of whether the RSSI is within acceptable range or is a matter of concern.

**Spreading Factor (SF)** – an indication of how much energy the device expends to transmit data. A device with poor connectivity to the network must expend more energy and thus is expected to have a shorter battery life.

**Spreading Factor** – a qualitative measurement of whether the SF is within acceptable range or is a matter of concern.