Analytics

The *Analytics* module[1] is a fully featured toolbox which lets you explore your positioning data through multiple interactive views.

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Configuration

Zoning

To get the most out of Pozyx Analytics we highly recommend you define some zones first. You can do this by going to https://app.pozyx.io/setup/planning/zones. Zones used for analytics should be of type 'Trigger area'. Zones of type 'Obstruction' and 'Positioning area' will not show up in the analytics. These are only used to improve the positioning accuracy.

You can group zones by giving them a common label. Doing this will give you the option in Pozyx Analytics to not only view your data for individual zones but also grouped by zone labels. E.g. If you have manufacturing zone A, manufacturing zone B, manufacturing zone C, warehouse A, warehouse B, refrigerator A, refrigerator B, … then it would be a good idea to group the manufacturing zones by giving them a common label 'manufacturing', and to group the warehouse zones by giving them a common label 'warehouses', and to group the refrigerators by giving them a common label 'refrigerators'. You will now be able to easily compare manufacturing zone A, with manufacturing zone B, and with manufacturing zone C, and also compare manufacturing with warehousing, etc.

Some important notes:

1. Zones should be defined beforehand: Because of performance reasons in Pozyx Analytics the zone presence of a tag is not calculated on the fly based on the tag's historical positions but is stored in a database. E.g. if a tag was located at point (x,y,z) at a certain point in time, and that point falls within zone A, then the database will have a record stating that the tag was at zone A at that point in time. This means that:
   a. If you define a zone after gathering data, the new zone will not be shown
   b. If you edit a zone after gathering data, the zone presence in Pozyx Analytics will be based on the old zone
   c. If you edit a zone while gathering data, the data gathered before editing the zone will be based on the old zone definition, and the data gathered after editing the zone will be based on the new zone definition
2. The same is true for zone labels.

Data retention

After obtaining a license for the Analytics pack you will have access to the Data retention settings at https://app.pozyx.io/settings/data-retention. For analytics to work you will have to enable data retention. You have the option to save all data or to only save data according to a certain schedule.

Enabling data retention will save your positioning data in a database on your gateway. The data will be stored there for 30 days. This means that on day 31 after enabling data retention the data from day 1 will be deleted and the data from day 31 will be stored instead. At the moment it is not yet possible to back up your data to another hard disk or to the cloud.

If the hard disk of your gateway would get full, data retention will be automatically disabled. You can check the available hard disk space by going to https://app.pozyx.io/devices/gateway/diagnostics, from where you can also clear disk space by erasing the saved positioning data. Careful: If you erase the saved positioning data you will no longer be able to see the analytics of this data.

Filtering data

In the heading of every Pozyx Analytics page you will find:

- A date range selector

Analytics ▸ Tag behavior: Heatmap	📅 30-12-2019 14:52 ➝ 30-12-2019 19:53	▼ Filtering on: 1 tag ID ×

- A filter to filter on tag, tag label, zone or zone label

Analytics ▸ Tag behavior: Heatmap	📅 30-12-2019 14:52 ➝ 30-12-2019 19:53	▼ Filtering on: 1 tag ID ×

The filters you apply are saved in your browser: When you go to another page in the same browser the same filters will be applied. But when you visit Pozyx Analytics from another computer, or from a different browser, you will have to re-select your filters.

Heatmap

Pozyx Analytics offers 2 types of heatmap: a time based heatmap and a tag based heatmap. You can switch between the 2 types by going into the heatmap options:

Time based heatmap

The time based heatmap shows you how long tags have been present at a certain location. On the following heatmap you can see that tags have been laying still on 3 spots.
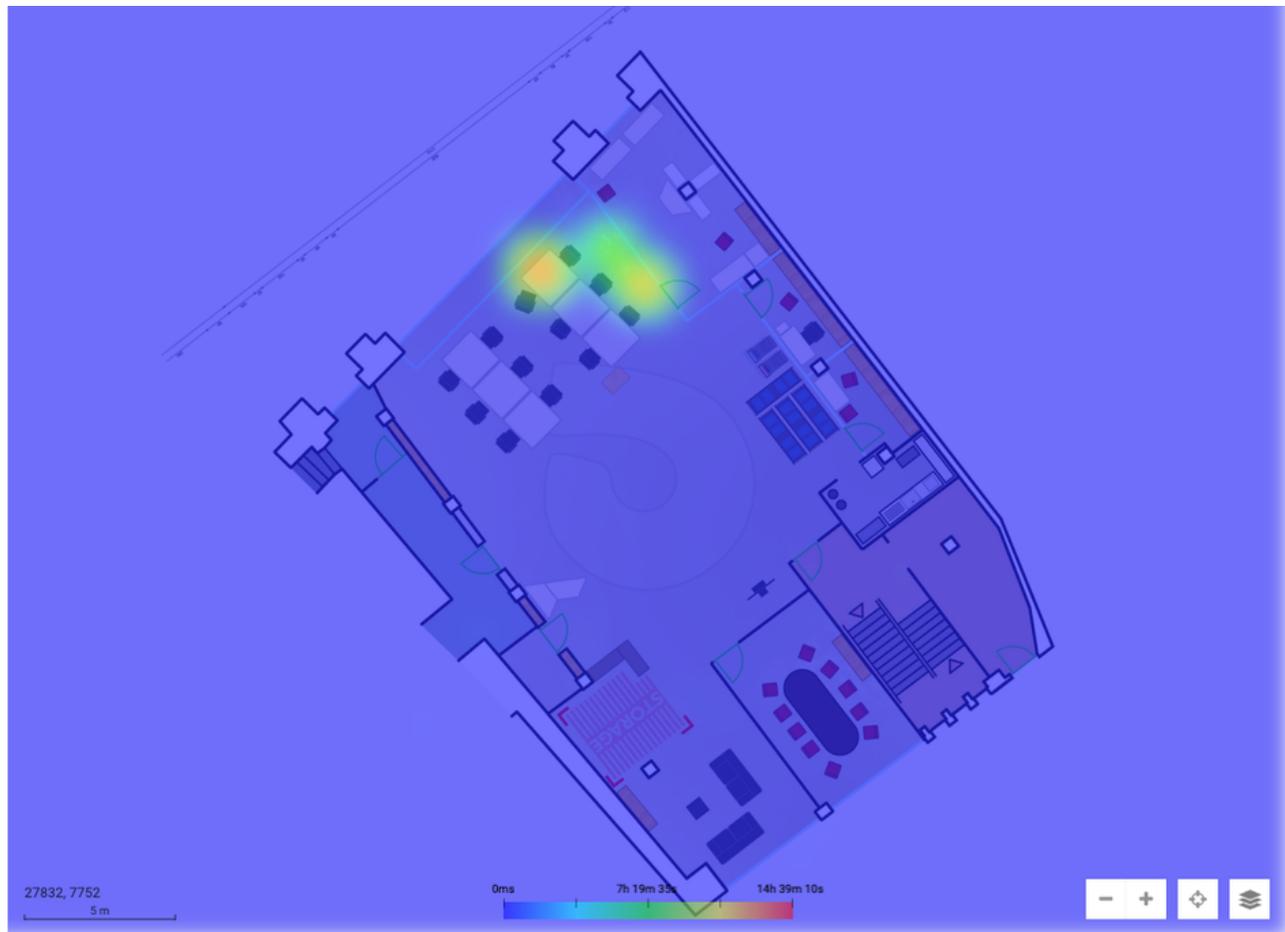
But because the tags have been laying still for a while, and because the heatmap scaling is linear, a lot of detail is lost: As seen in the heatmap legend, the red areas indicate 14h 39m of tag presence, the green areas indicate 7h 19m of tag presence. A tag presence of just a couple of seconds will be completely blue and will thus be lost in the heatmap. A data transformation can bring back these details. There are 3 data transformations available: A square root, a cube root and a fifth root transformation. You can apply these by going into the heatmap options:
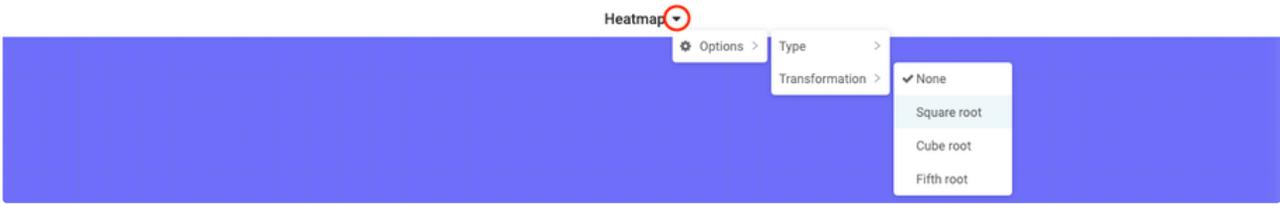
After applying a transformation to the data, a lot more detail is shown: As seen in the heatmap legend, the red areas still indicate 14h 39m of tag presence, but the green areas now indicate 7s of tag presence.
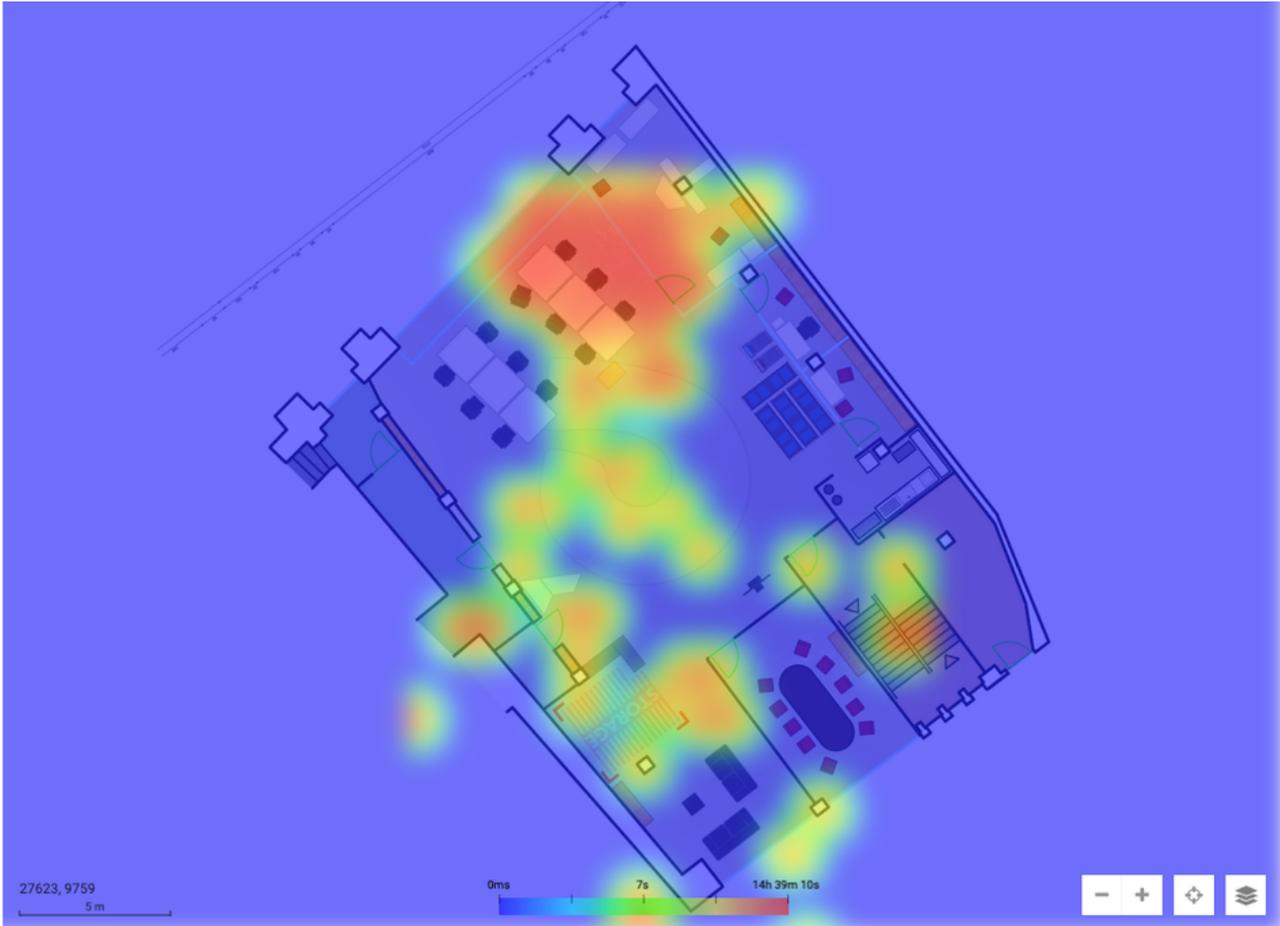
Tag based heatmap

The tag based heatmap works in a similar way as the time based heatmap, but instead of showing you how longs tags have been present at a certain location it shows you how many distinct tags have been present at a certain location.

Time budgets

Total time spent in zones

The *total time spent in zones* shows you how much time all tags combined have spent in your different zones.

Total time spent in zones ▾	
calling cell 1 1s (51%)	Hardware lab 1s (49%)

☐ calling cell 1 ☐ Hardware lab
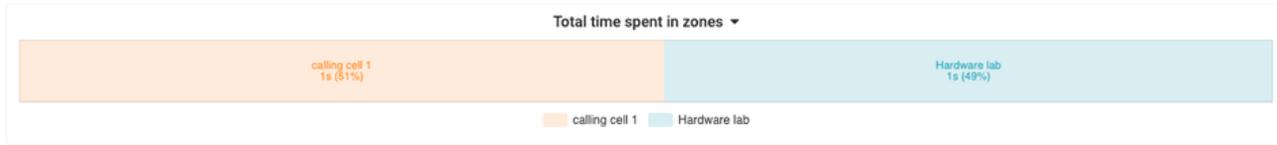
The percentages have to be taken with a grain of salt if you have overlapping zones: If a tag was 100% of the time in zone A, and at the same 100% of the time in zone B (because the zones are overlapping), the chart will show 50% for zone A, and 50% for zone B.

Time spent in zones

The *time spent in zones* shows for each tag how much distance it has travelled and how much time it has spent in each zone.

Tag ID ⇕	Labels ⇕	Distance ⇕	Time spent in zones
#0		9.5 m	calling cell 1 1s (51%) — Hardware lab 1s (49%)
#1		2.7 m	
#2		2.2 m	

< **1** >
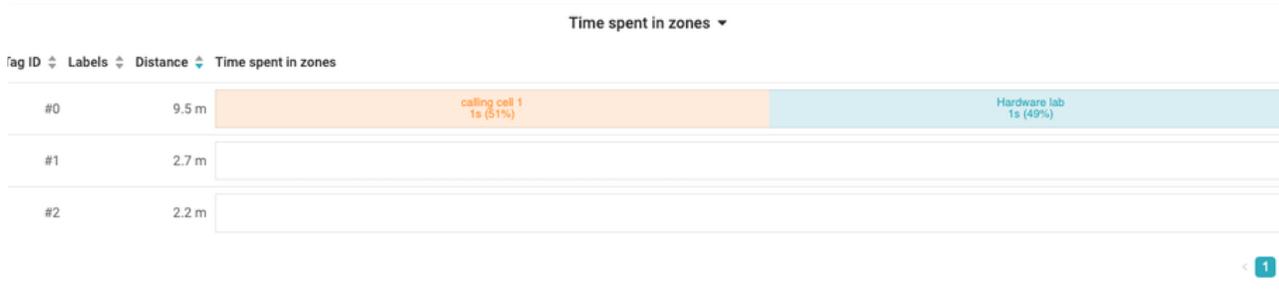
The same side note on overlapping zones for the *Total time spent in zones* widget applies here.

Trajectories

This page will not display anything unless you select a tag in the filter menu. It's created like this because the page is best used with a very small selection of tags. Showing the data of too many tags would make the page unusable.
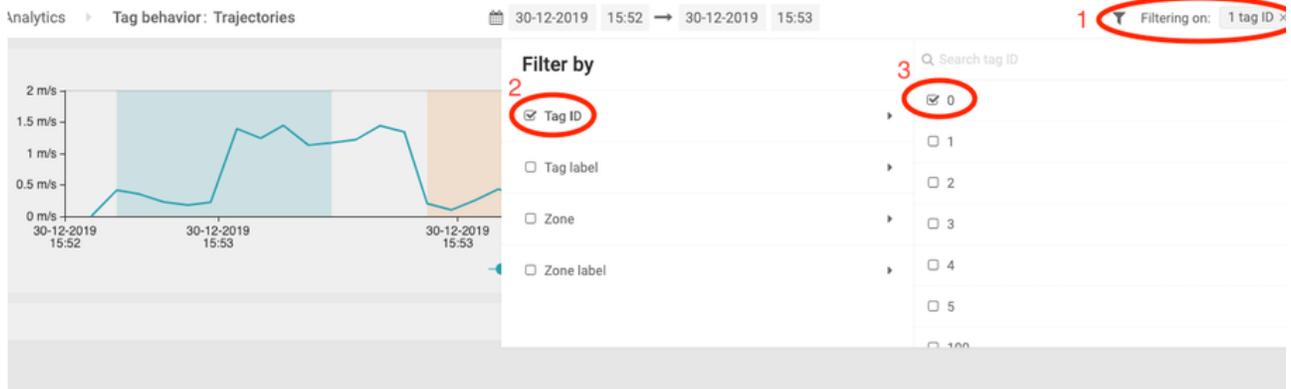
After selecting a tag you will see it's activity in the *Aggregated tag activity* widget:
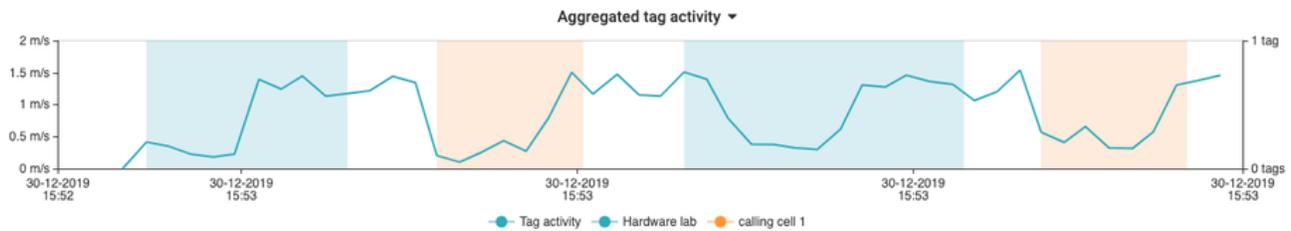
You will see how active the tag was (= how fast it was moving) and in which zones it has been (= shown by the background color).
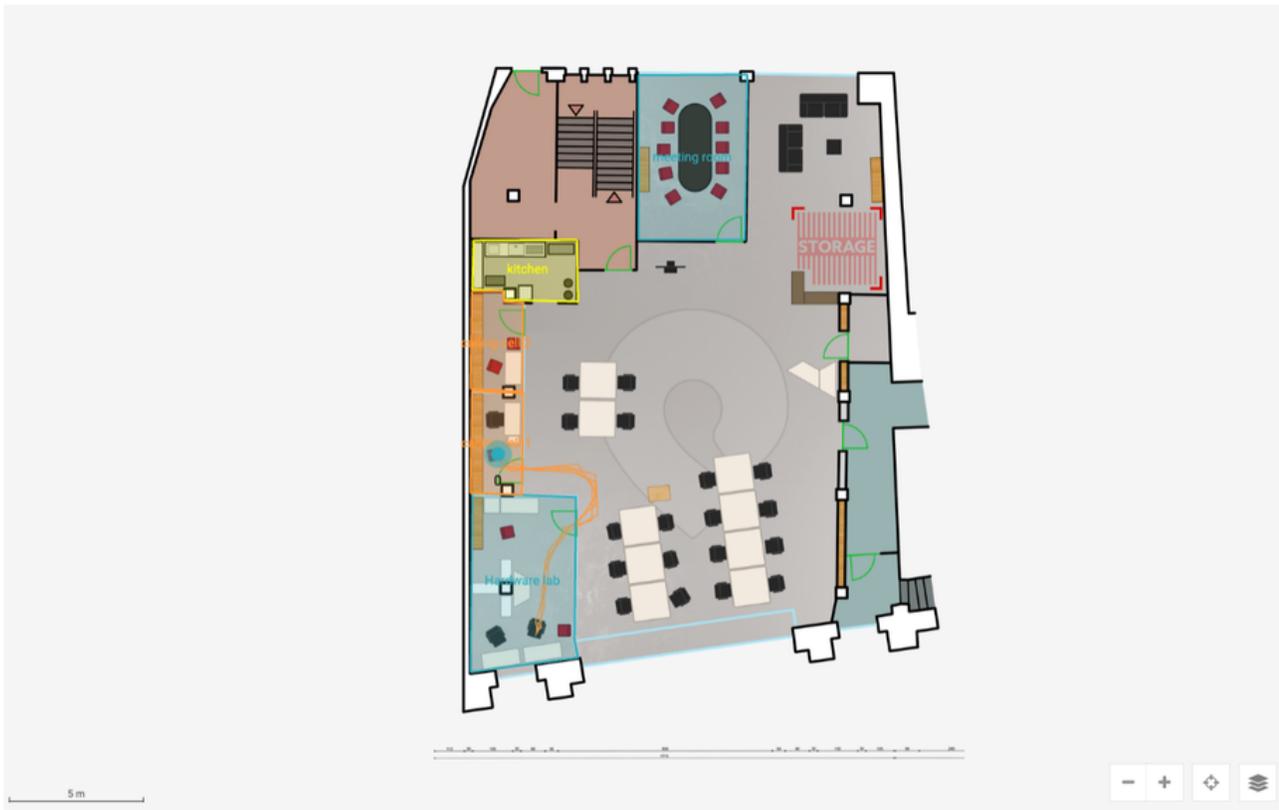
Looking at the example above we can see that the tag we have selected (tag 0) has been moving back and forth between the Hardware lab and Calling cell 1. Hovering over a point in time on the *Aggregated tag activity* widget will show the position of the tag at the same point in time on the *Trajectories* widget: At 15:53 tag 0 was in the Hardware lab. We can see this on both the *Aggregated tag activity* widget and on the *Trajectories* widget.

You can zoom in and out in time by scrolling on the *Aggregated tag activity* widget. You can also click, hold, drag and release on it to zoom in on a certain time period.

Zone history

The zone history page gives you a log file of zone entries and exits.

When a tag is powered off (or when it can not get positioned) for 1 minute, it will be registered as a zone exit. When the tag is powered on (or when it can be positioned) again, it will be registered as a zone entry. 1 minute is the default time, but this can be tweaked by Pozyx engineers to better align with your use case.

Because there's hysteresis on the zone triggering, 1 position update is not enough to trigger a zone entry or exit. Which means that if a tag for whatever reason makes a quick jump outside of a zone, and almost directly goes back into the zone, this won't be reflected in the zone history log. This data smoothing can also be tweaked by Pozyx engineers to better align with your use case.

Zone analytics

The *zone metrics* table shows information about all your zones:

- Total # entries: The total number of entries in this zone. If the same tag enters a zone twice (enter -> leave -> enter), the total number of entries will be increased with 2.
- Min # tags: The minimum number of tags at one point in this zone.
- Max # tags: The maximum number of tags at one point in this zone.
- Mean # tags: The mean number of tags at one point in this zone.
- Mean entry to exit duration: The mean duration between a tag entering a zone and the same tag leaving that zone. If there were 5 different tags, and each one entered the zone, stayed there for 3 seconds, and then left, the *mean entry to exit duration* would be 3 seconds. If each of those 5 tags did this 5 times, the *mean entry to exit duration* would still be 3 seconds.
- Total duration: The total time that tags have spent in this zone.
- Mean duration for tags that went in zone: The mean (total) duration that tags have spent in that zone. If there were 5 different tags, and each one entered the zone, stayed there for 3 seconds, and then left, the *mean duration for tags that went in zone* would be 3 seconds. If each of those 5 tags did this 5 times, the *mean duration for tags that went in zone* would be 15 seconds.