

The EveryAware Platform

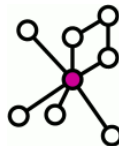
Generic Information System for
Ubiquitous and Subjective Data



Research Center



UNIKASSEL
VERSITÄT



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Gerd Stumme

Agenda

- Data and its Context
- Platform
- Collected Data and Results

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EveryAware

Enhance Environmental Awareness
through Social Information Technologies

<http://everyaware.eu>



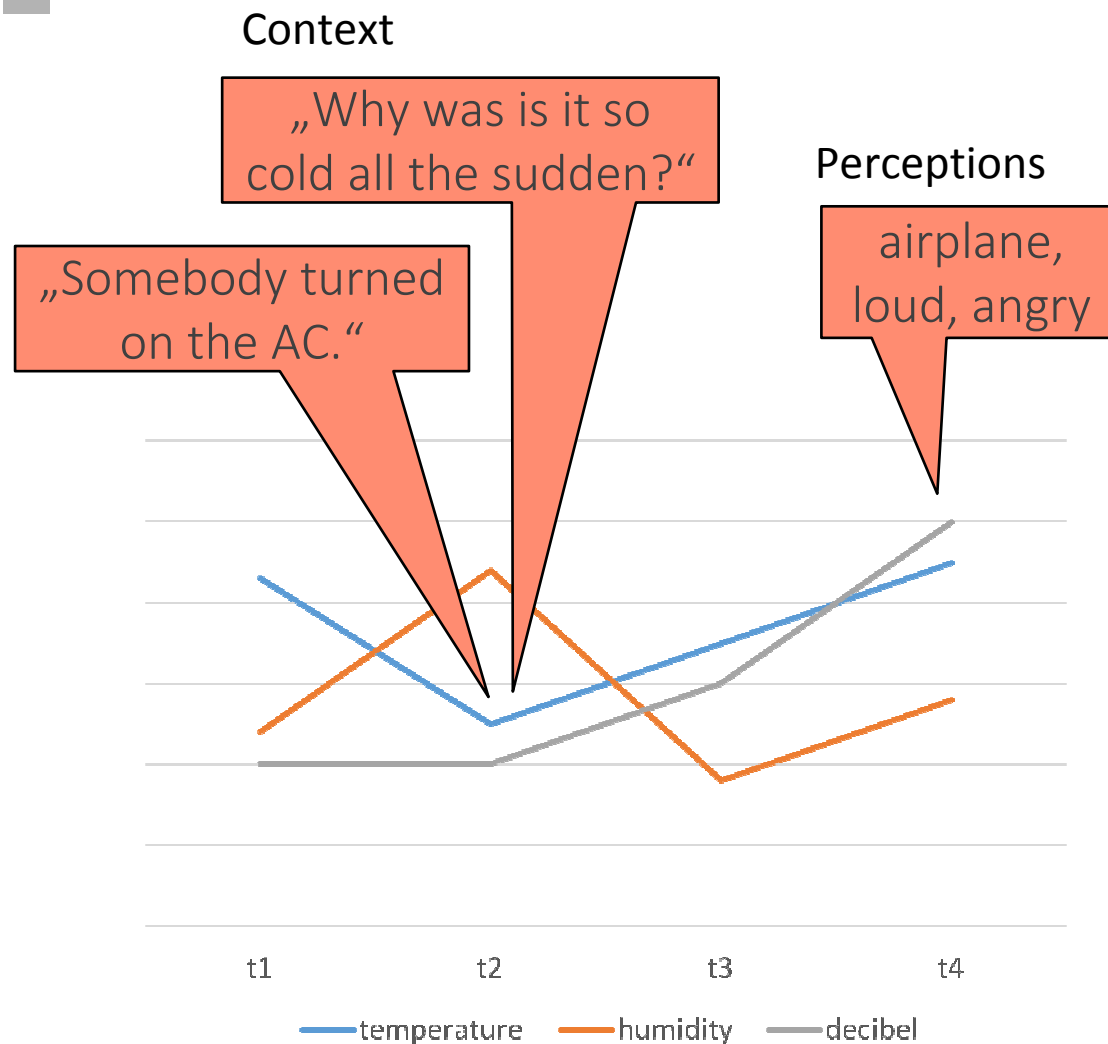
Objective



Subjective



Existing Platforms



xivelyTM
by LogMeIn

ThingSpeak

sense

...



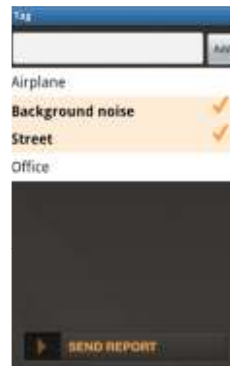
EveryAware Applications



WideNoise

participatory noise sensing

<http://widenoise.eu>

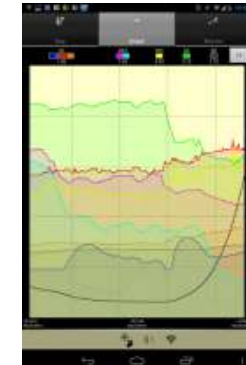


AirProbe

collective air quality monitoring

<http://airprobe.eu>

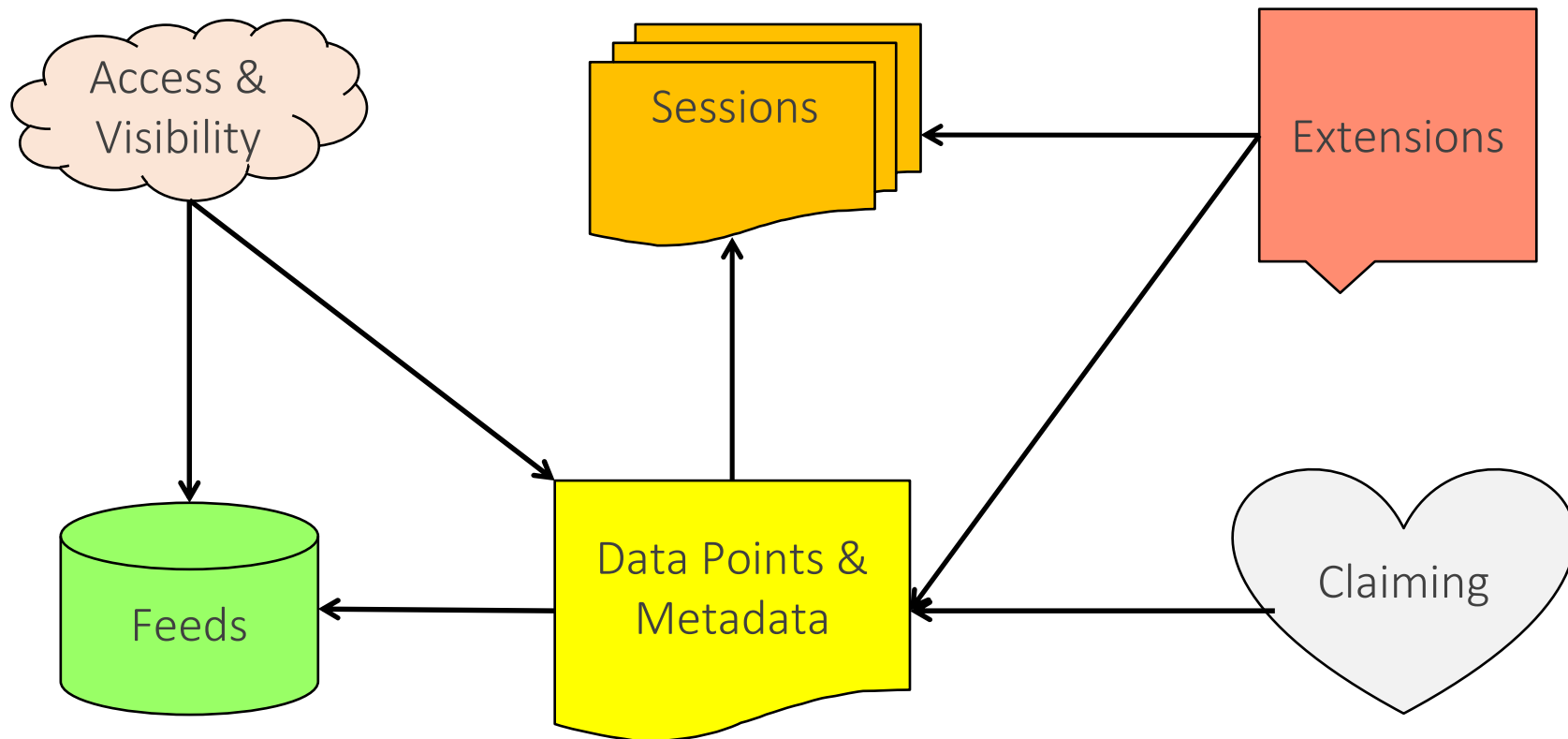
- Correlation between objective and subjective data
- Behavioral shifts



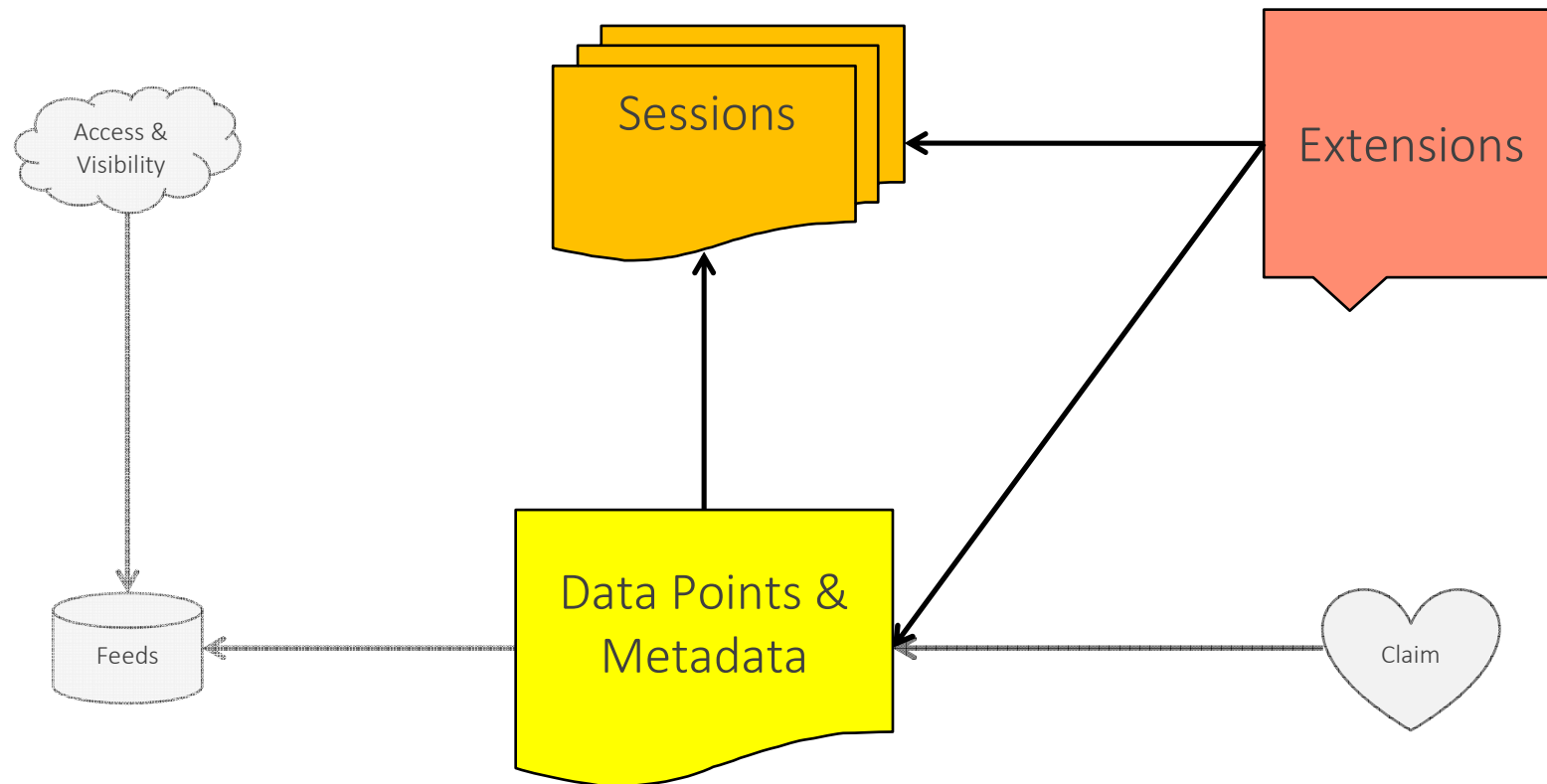
Agenda

- Data and its Context
- Platform
 - Conceptual Layer
 - Technical Layer
 - Visualization Layer
- Collected Data and Results

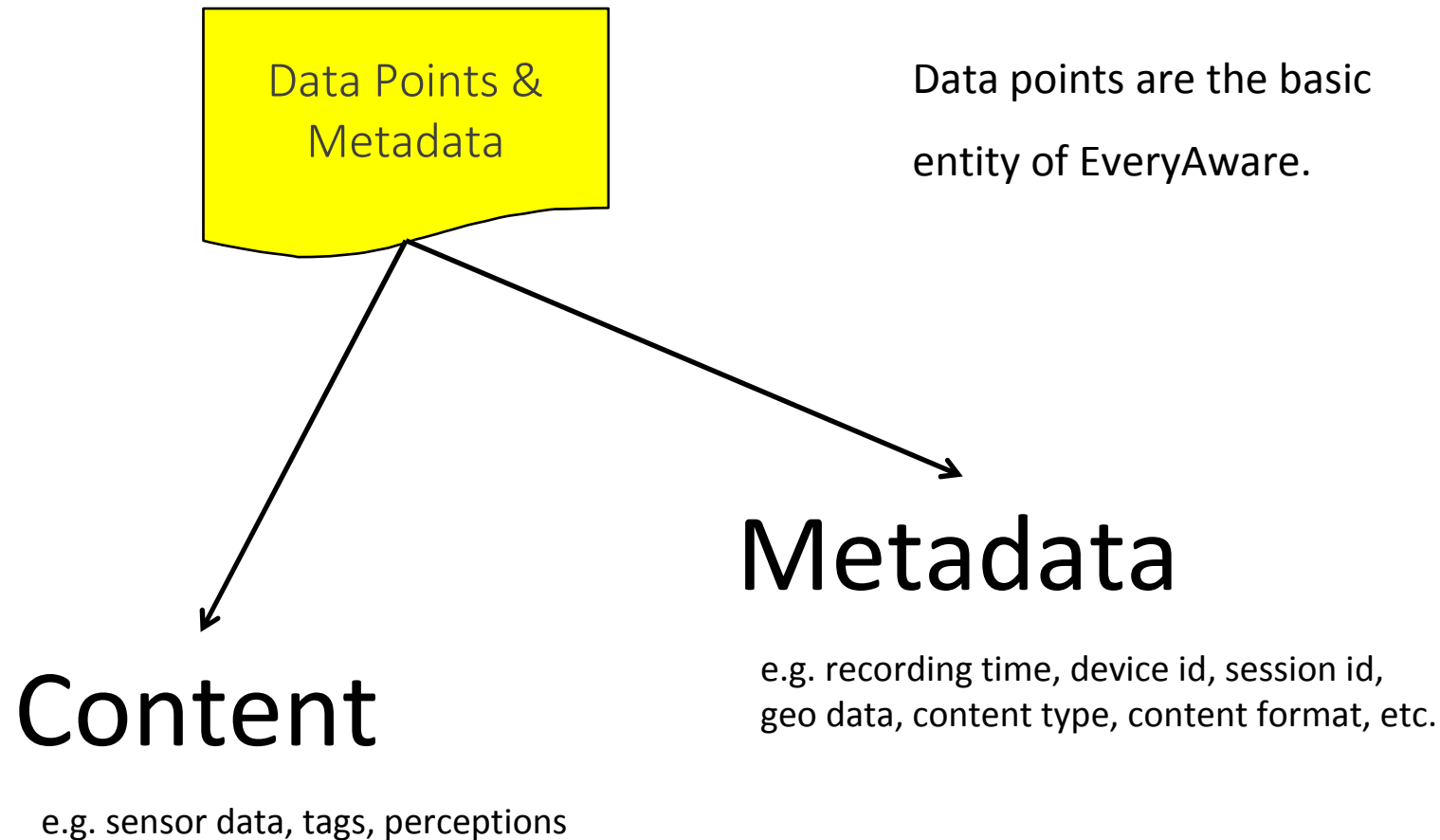
Conceptual Layer



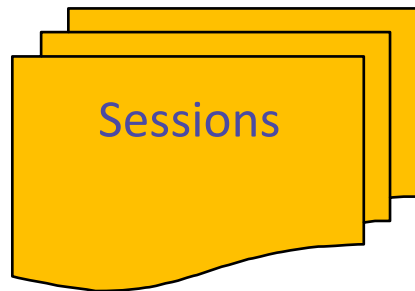
Conceptual Layer



Conceptual Layer (1)

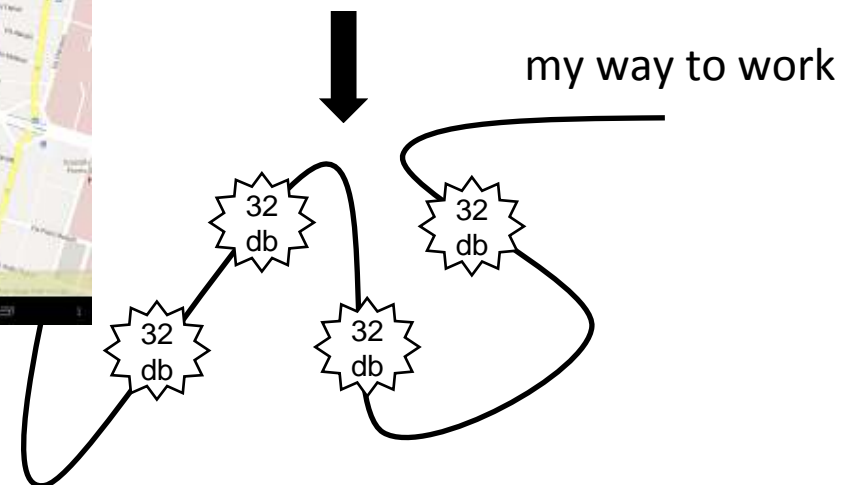
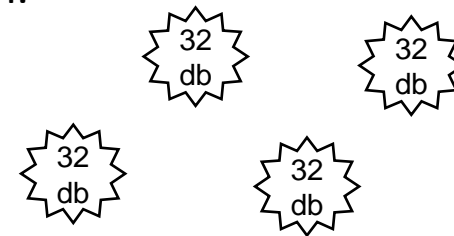
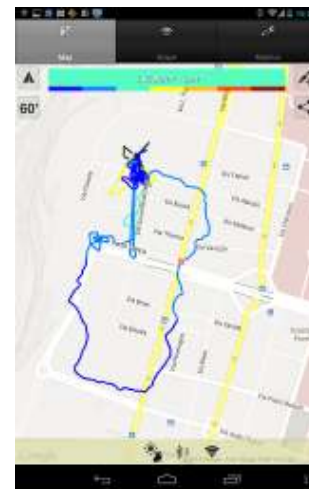


Conceptual Layer (2)



Sessions are collections of data points limited to a fixed timespan.

Sessions allow to introduce semantical entities such as „my way to work“ or „a stroll in the park.“



Conceptual Layer (3)

Extensions

Data points and session
can be extended with
additional information.

Data Point

e.g. a single WideNoise reading

43
dB

Session

e.g. a AirPr

32
db

32
db

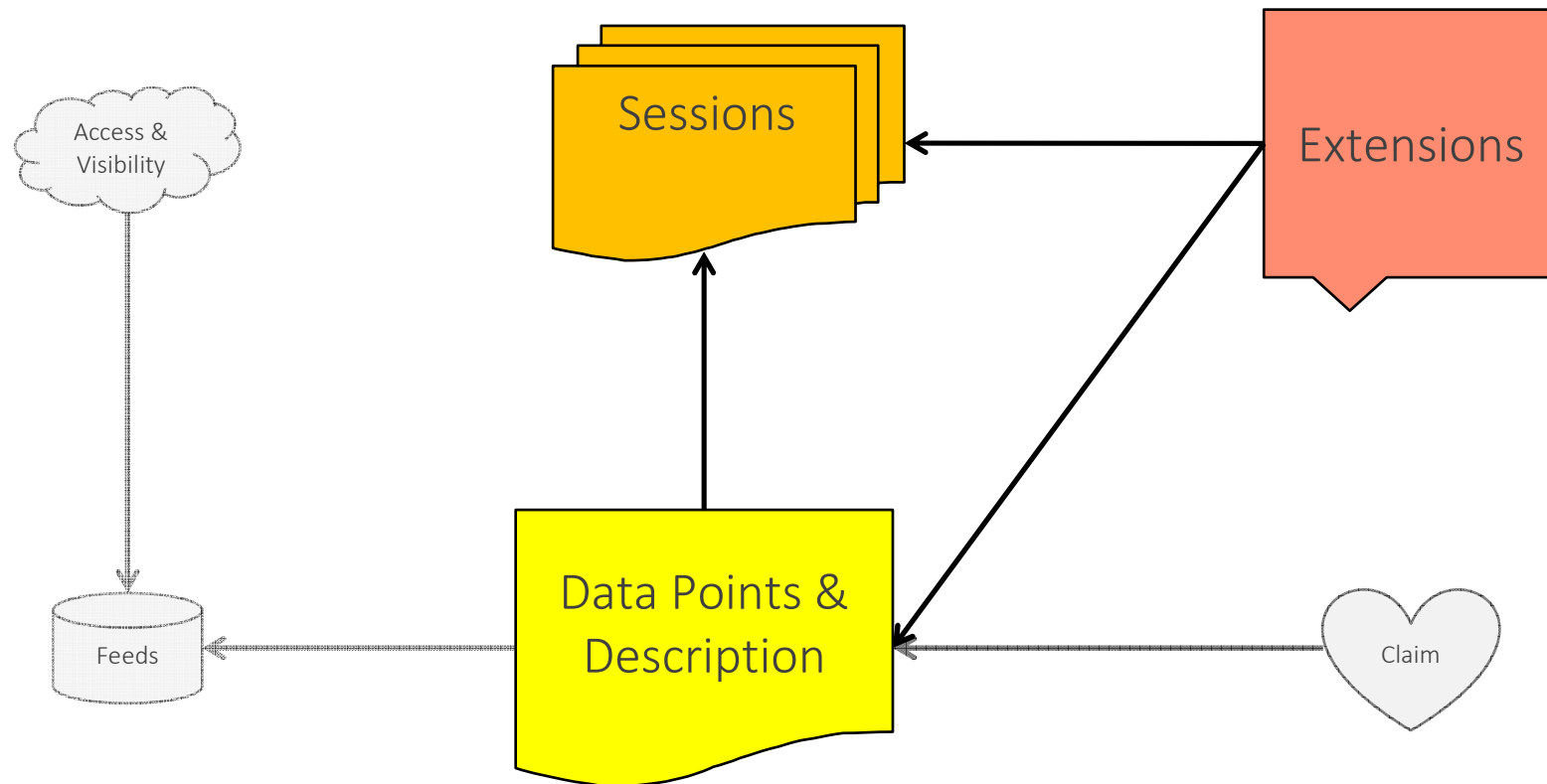
32
db



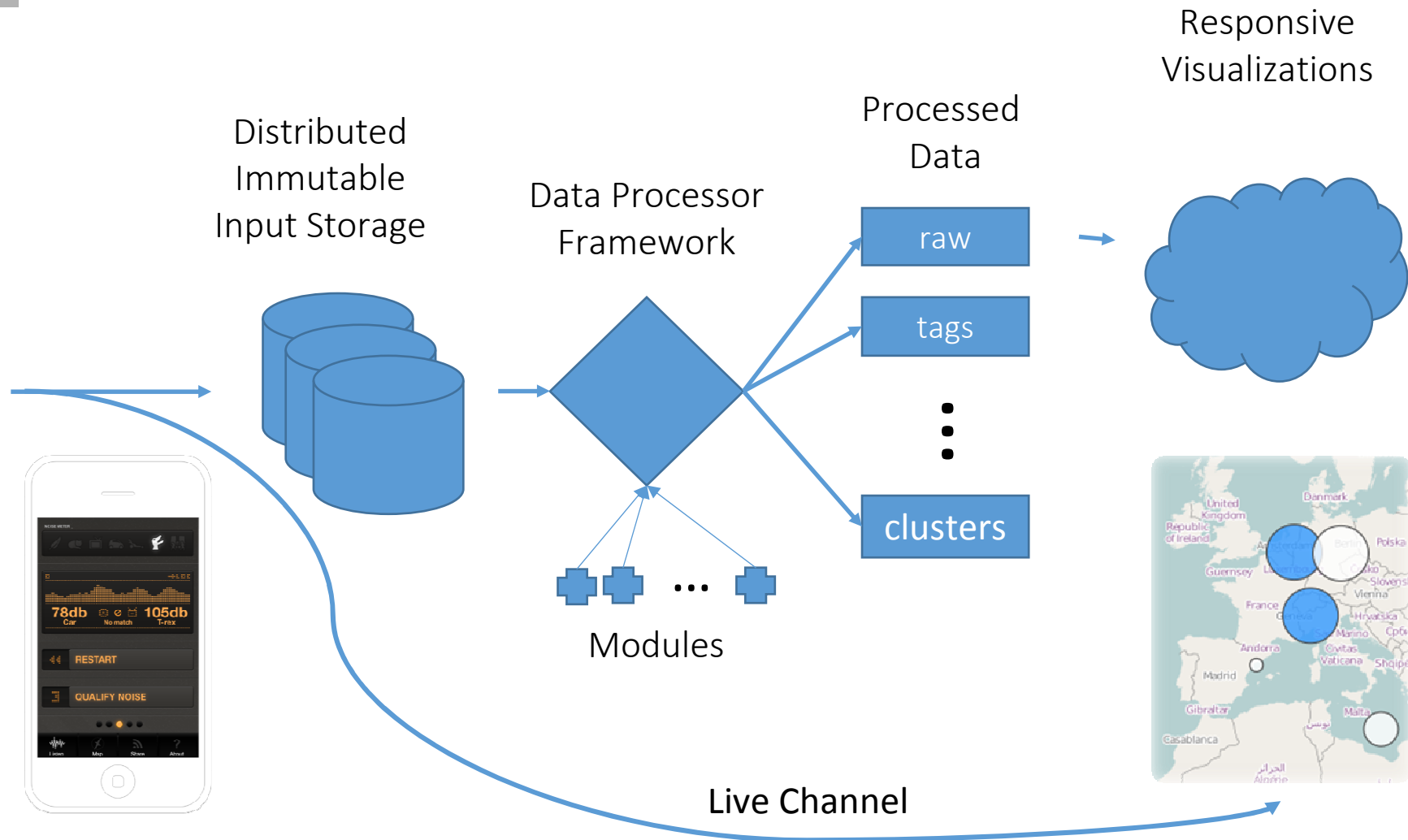
sunday
sunny
bike
hectic



Conceptual Layer (4)



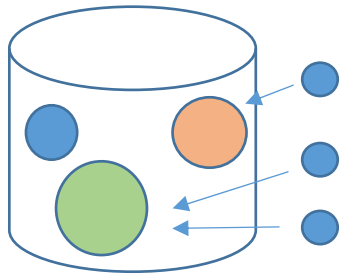
Technical Layer



Architecture

Visualization Layer

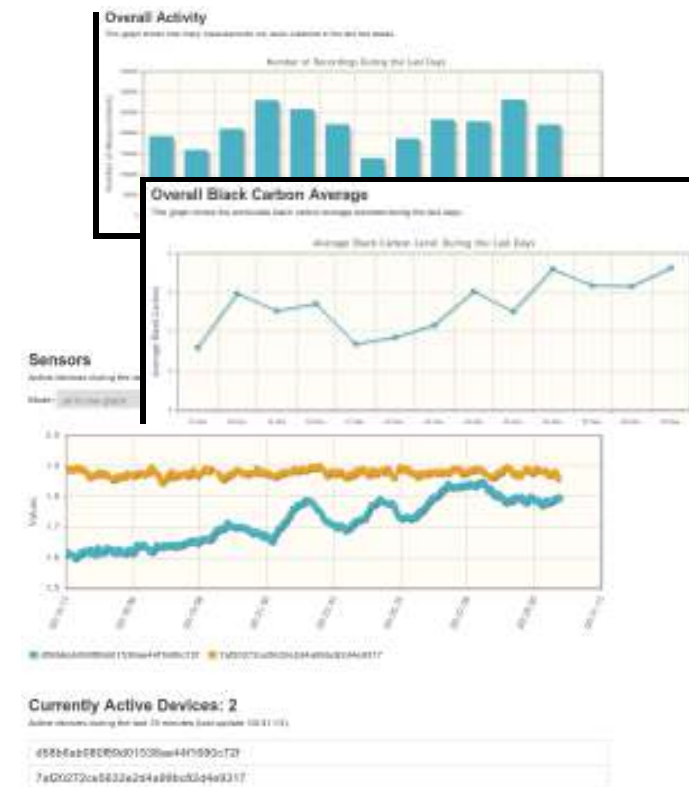
Public and personal grids and clusters
Incremental caching for public grids and clusters



Heatmap



Graphs and Statistics



Agenda

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Overall Statistics

- AirProbe



- 16,072,015 measurements
- 45 sensor boxes
- 46 users
- 50 devices
- 1,199 tags

- WideNoise Plus

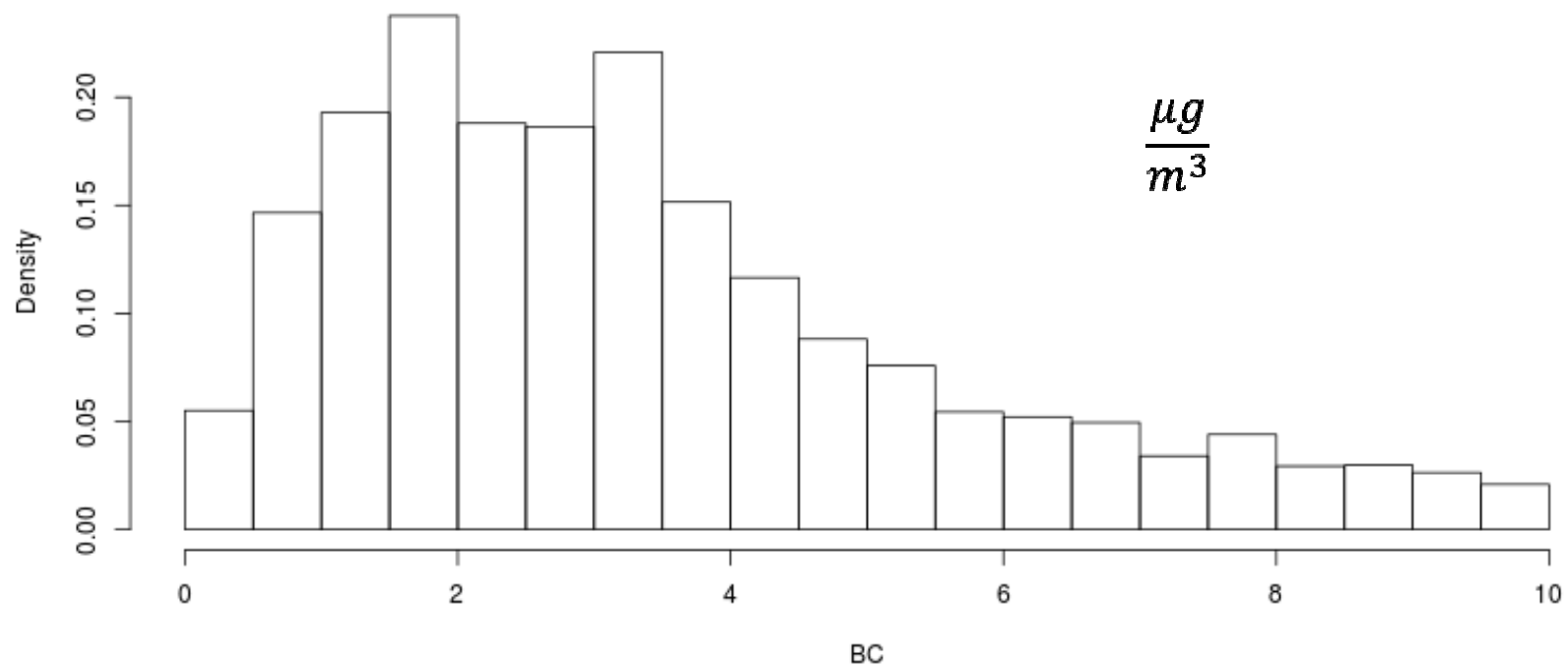


- 47,749 measurements
- 15,089 devices
- 22,234 tags

Week of APIC	Measurements
3 rd	1,409,770
4 th	1,548,607
5 th	1,364,537
6 th	1,990,658
Sum	6,313,572

Collected Data - AirProbe

Black Carbon



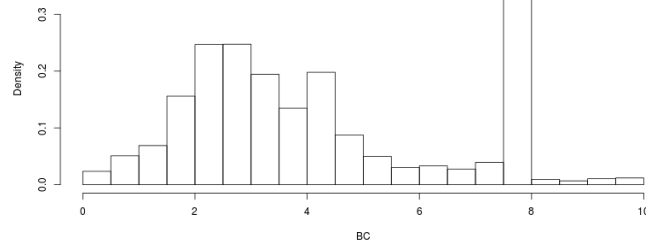
2013-04-11 00:00:00
2013-11-29 12:00:00

Collected Data - AirProbe

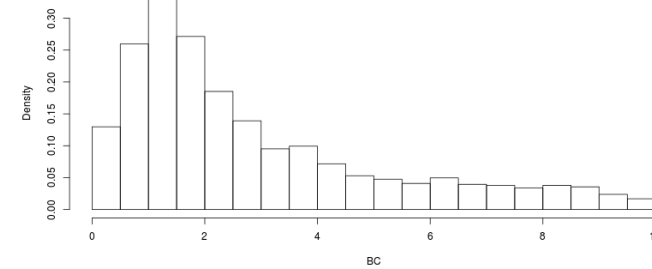
Black Carbon



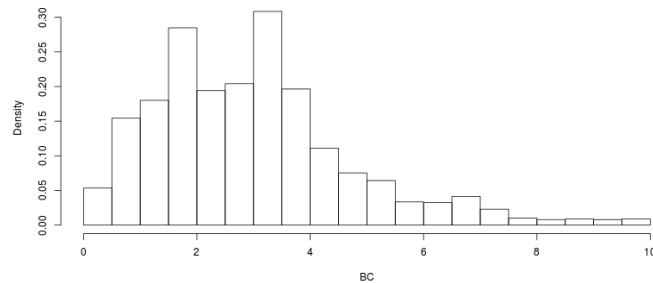
Antwerp



London

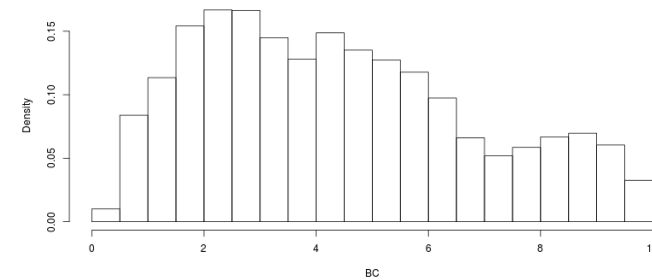


Kassel



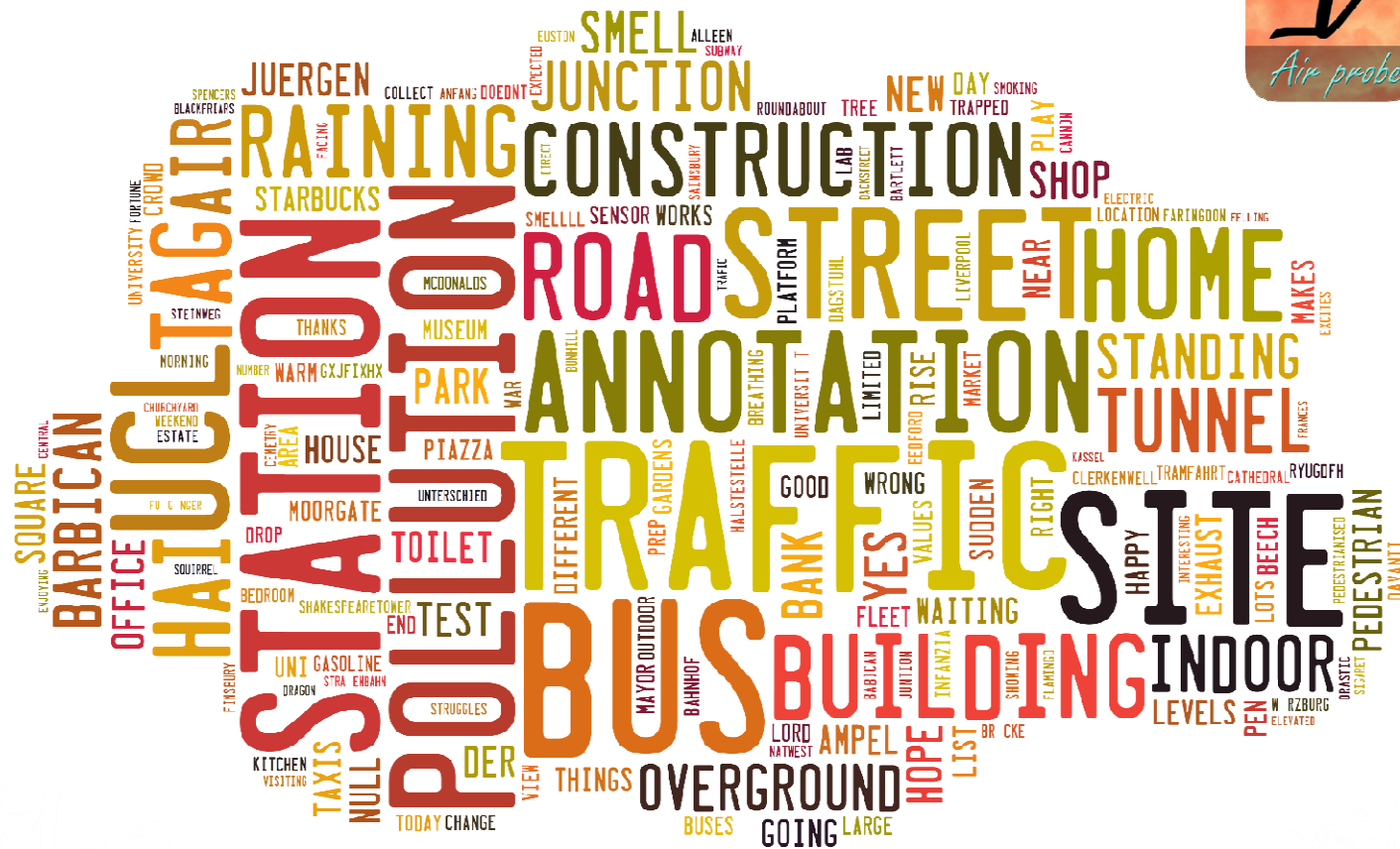
$\frac{\mu g}{m^3}$

Turin



2013-04-11 00:00:00
2013-11-29 12:00:00

Tags



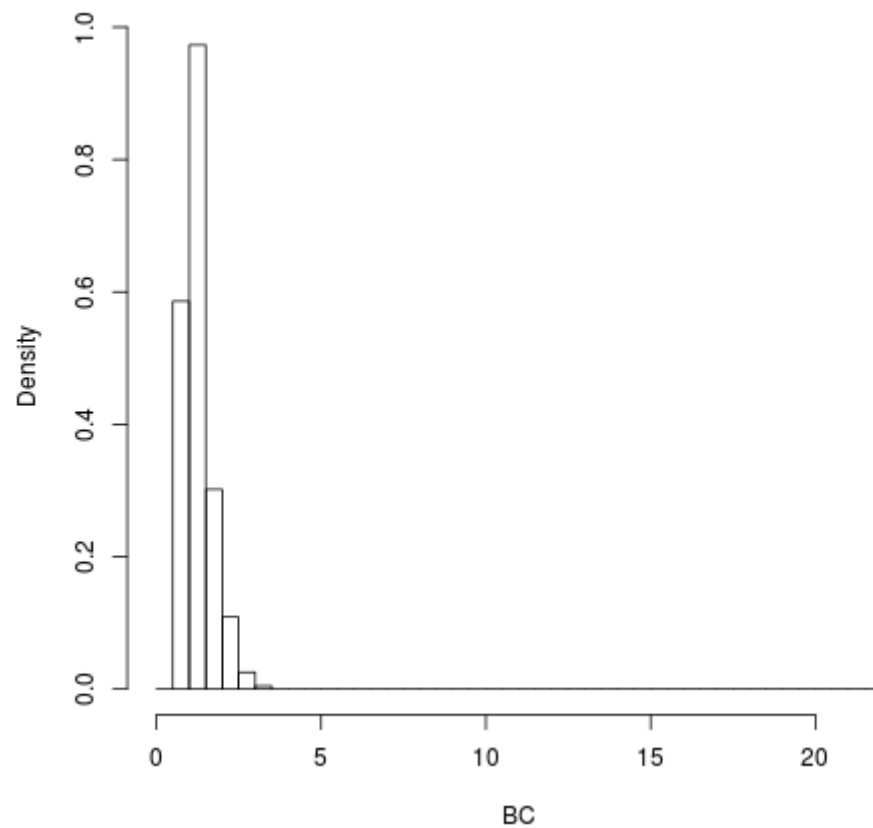
2013-04-11 00:00:00
2013-11-29 12:00:00

Collected Data - AirProbe

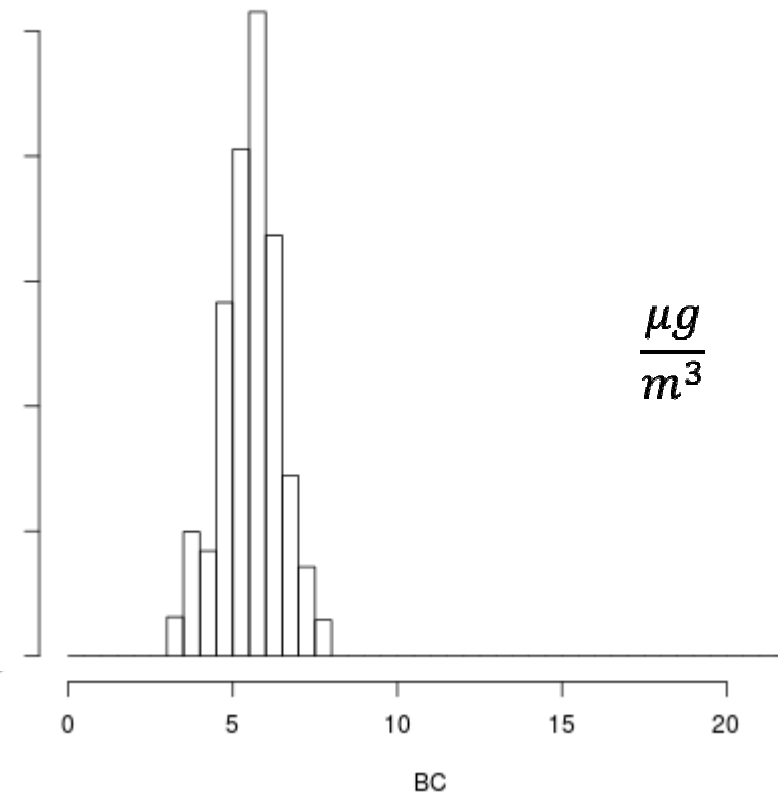
Tags



Tree (4096)



Street (2495)



$\frac{\mu g}{m^3}$

2013-04-11 00:00:00
2013-11-29 12:00:00

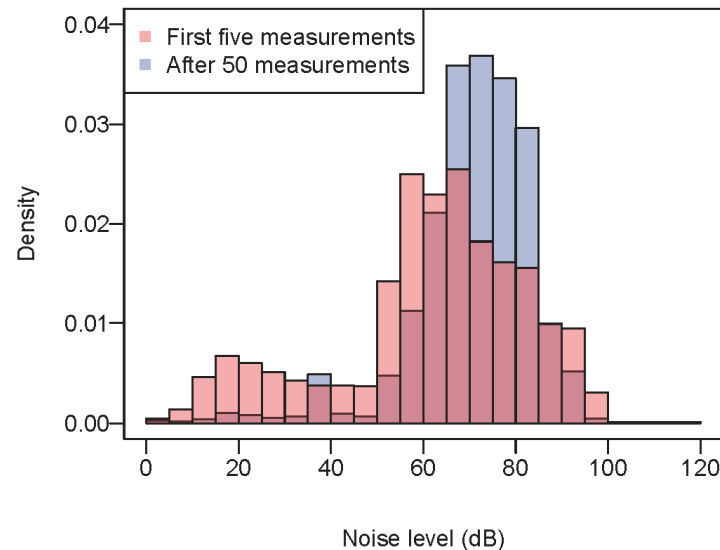
Results - WideNoise

Behavior and Perceptions

Becker, Martin, Caminiti, Saverio, Fiorella, Donato, Francis, Louise, Gravino, Pietro, Haklay, Mordechai (Muki), Hotho, Andreas, Loreto, Vittorio, Mueller, Juergen, Ricchiuti, Ferdinando, Servedio, Vito D. P., Sirbu, Alina and Tria, Francesca.
 "Awareness and Learning in Participatory Noise Sensing." PLOS ONE 8 , no. 12 (2013): e81638.

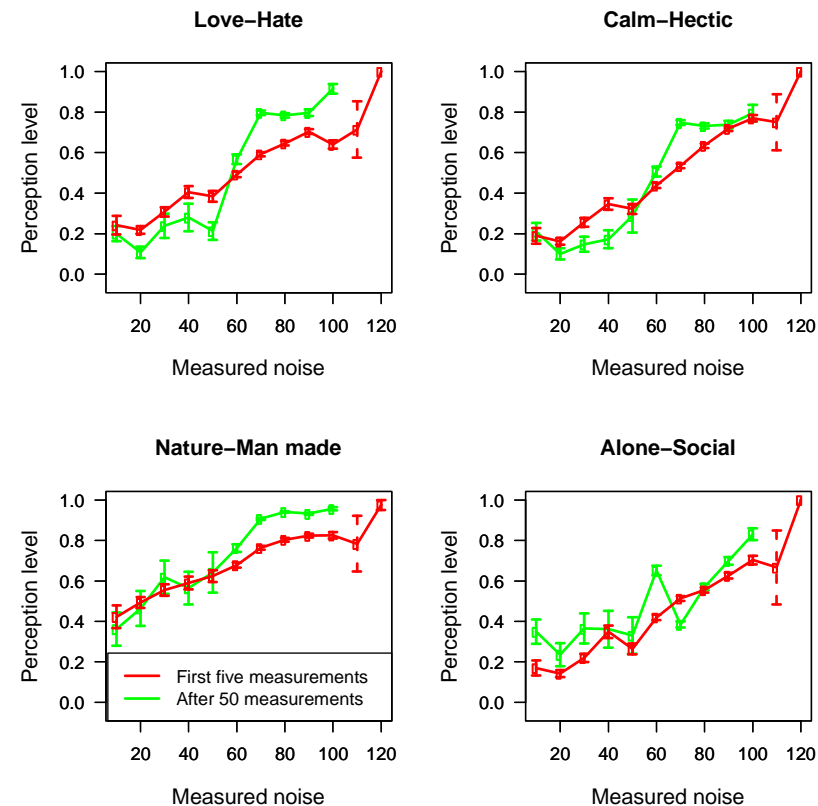


Noise level histogram



- Behavioral shifts towards measuring loud noise
- Correlation between noise and perception visible and changing

Noise – Perception correlation

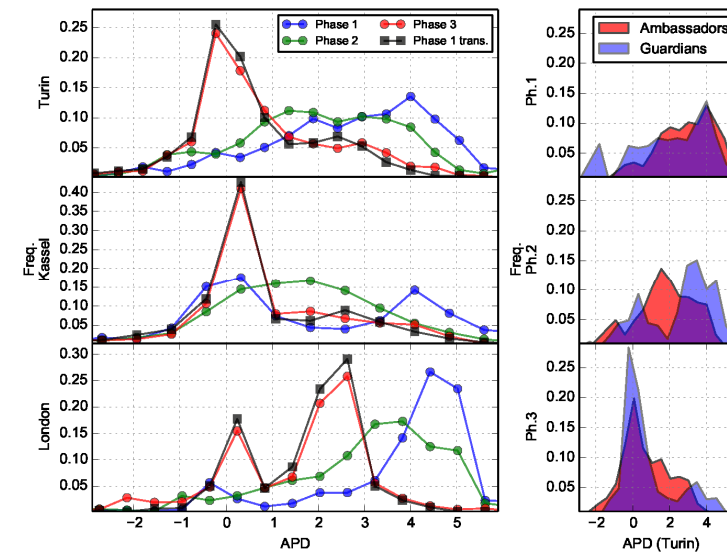


Results – AriProbe (APIC) Behavior and Perceptions

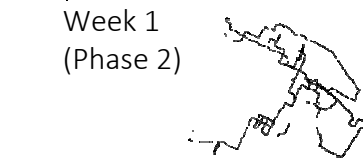
Alina Sirbu, Martin Becker, Saverio Caminiti, Bernard De Baets, Bart Elen, Louise Francis, Pietro Gravino, Andreas Hotho, Stefano Ingarrà, Vittorio Loreto, Andrea Molino, Juergen Mueller, Jan Peters, Ferdinando Ricciuti, Fabio Saracino, Vito D. P. Servidio, Gerd Stumme, Jan Theunis, Francesca Tria, Joris Van den Bossche
Participatory patterns in an international air quality monitoring initiative (under review)



Air quality estimation accuracy



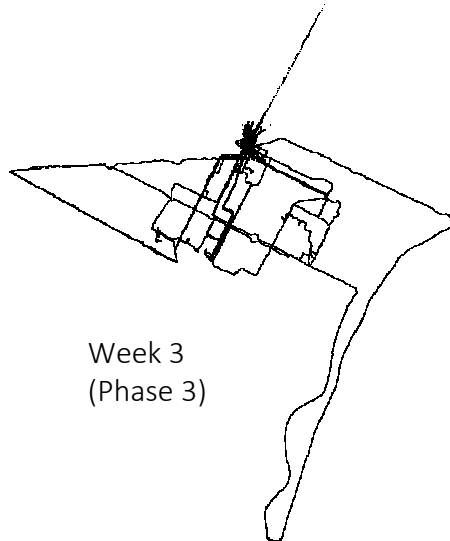
Week 1
(Phase 2)



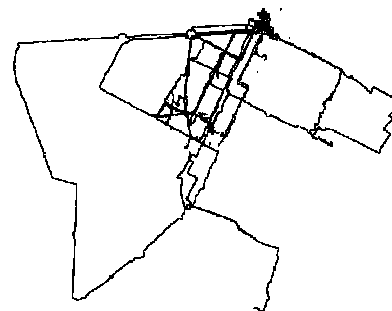
Week 2
(Phase 2)



Week 3
(Phase 3)



Week 4
(Phase 3)



Movements for
a single user

- Behavior changes based on incentives
- Users learn to estimate air quality based on given information

Agenda

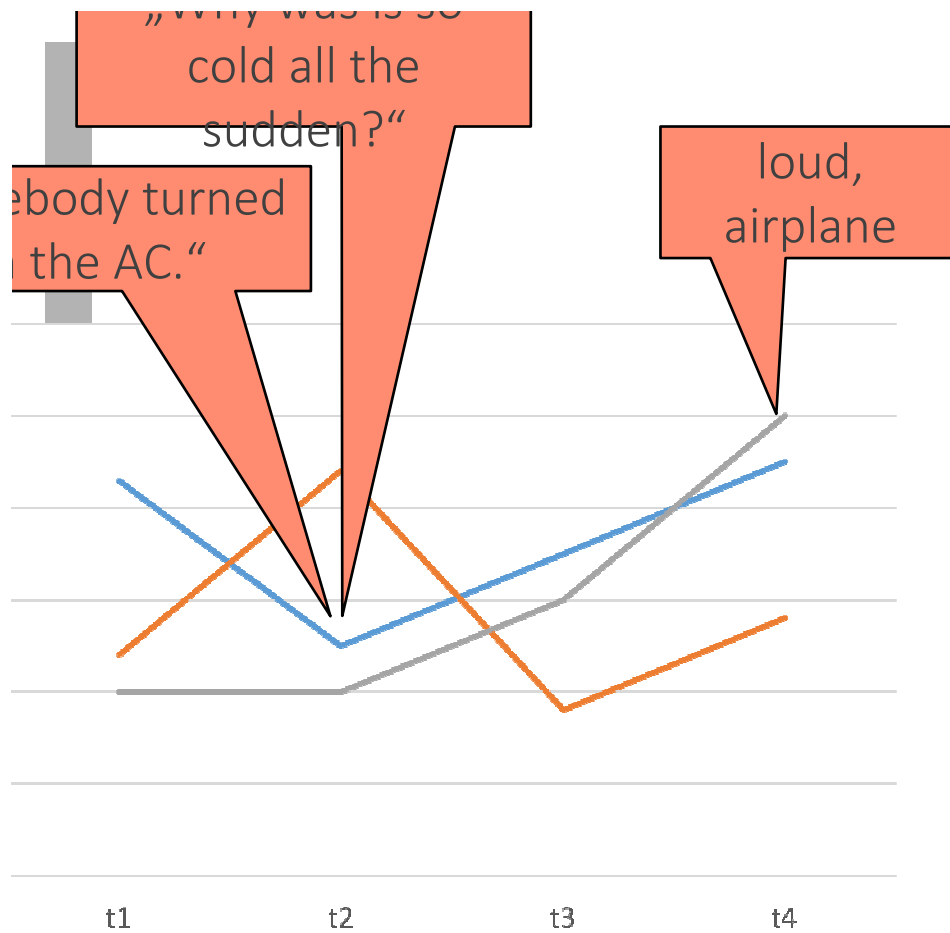
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Thank you!

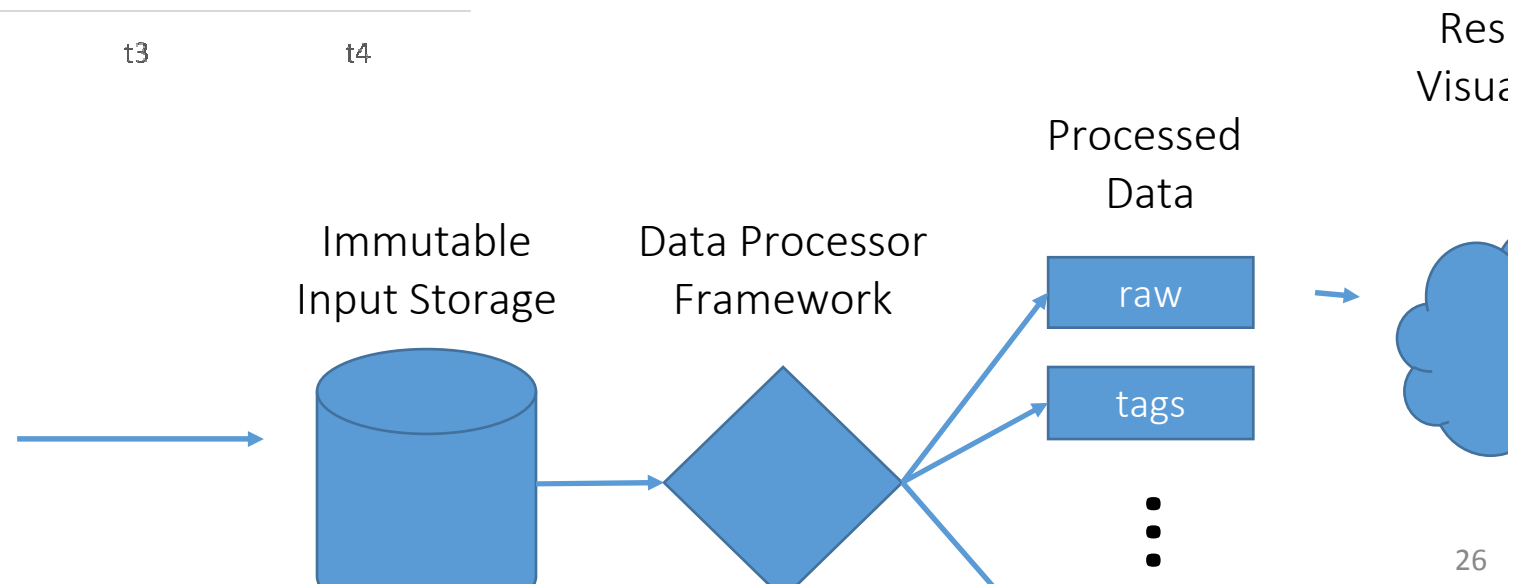
- A scaleable platform running 24 / 7
- Several applications in action with more to come
- Combining sensor data and perceptions
- Analysing relations between objective and subjective data, and behavioral change
- Providing analysis back to the community



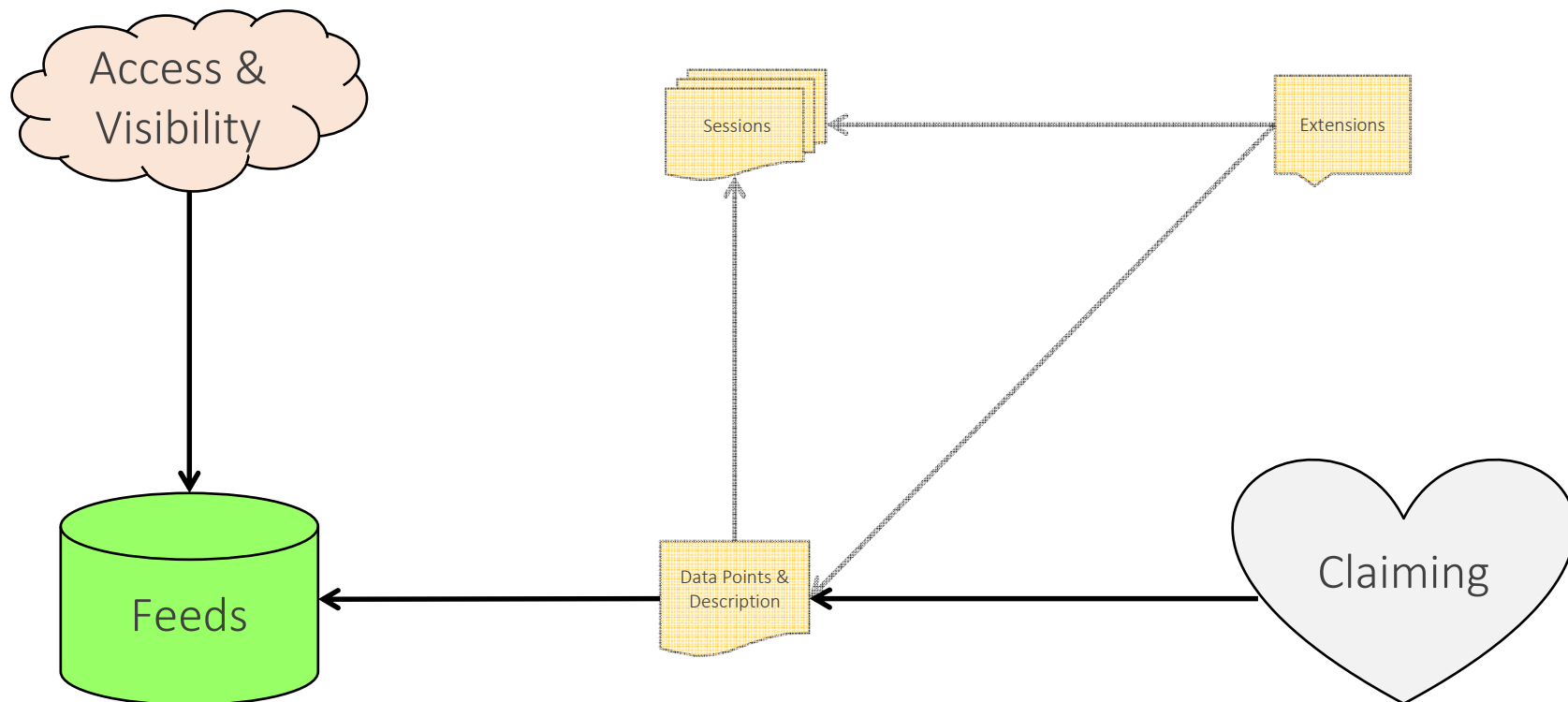
Anybody can participate!
<http://cs.everyaware.eu>



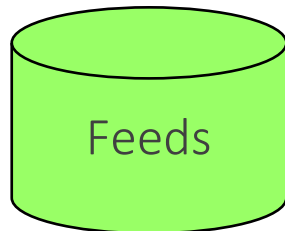
Thank you!



Conceptual Layer (4)



Conceptual Layer (5)



Feeds are collections of data points.

Feeds allow to

- organize data points
- attach data points to real world entities and
- share data points with the public or other users.

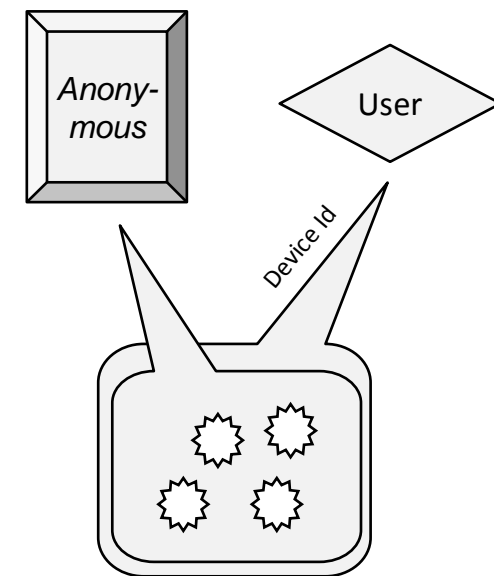


Access

- per feed
- open / closed

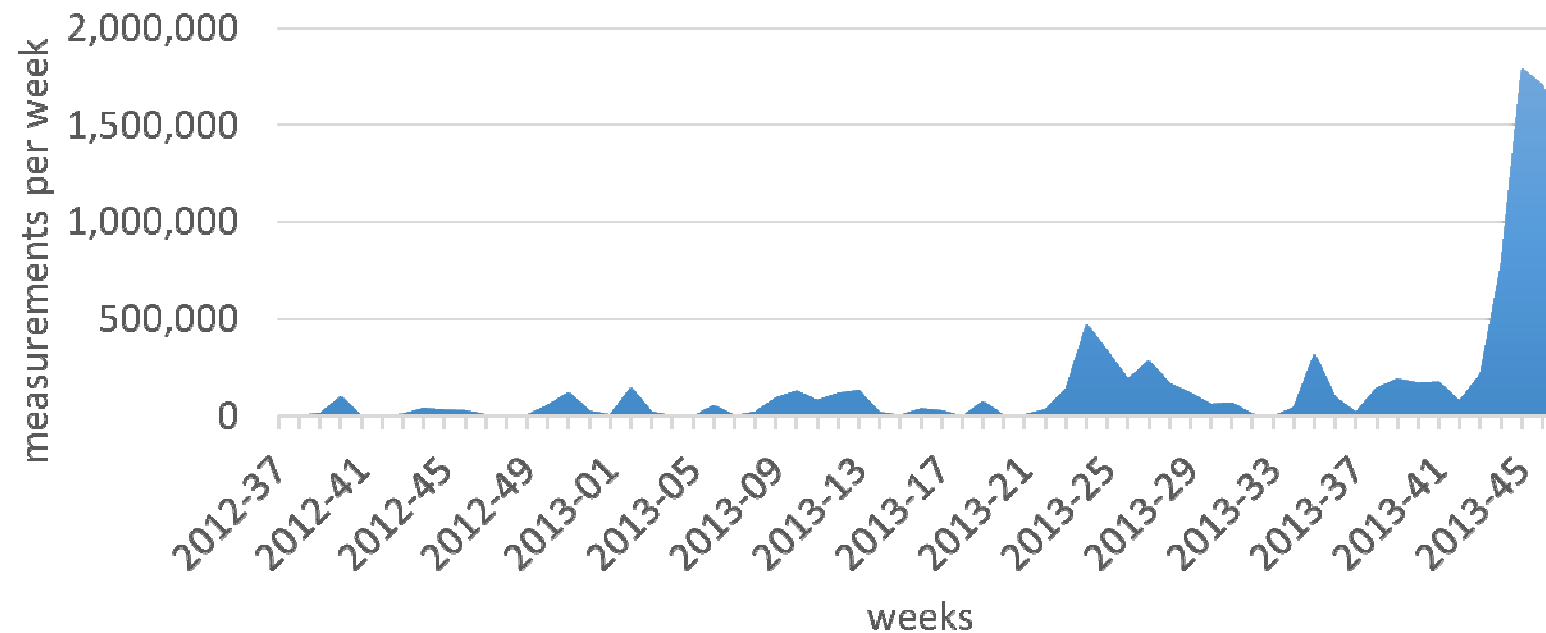
Visibility

- point-centric approach
- feed-dependent
- different levels



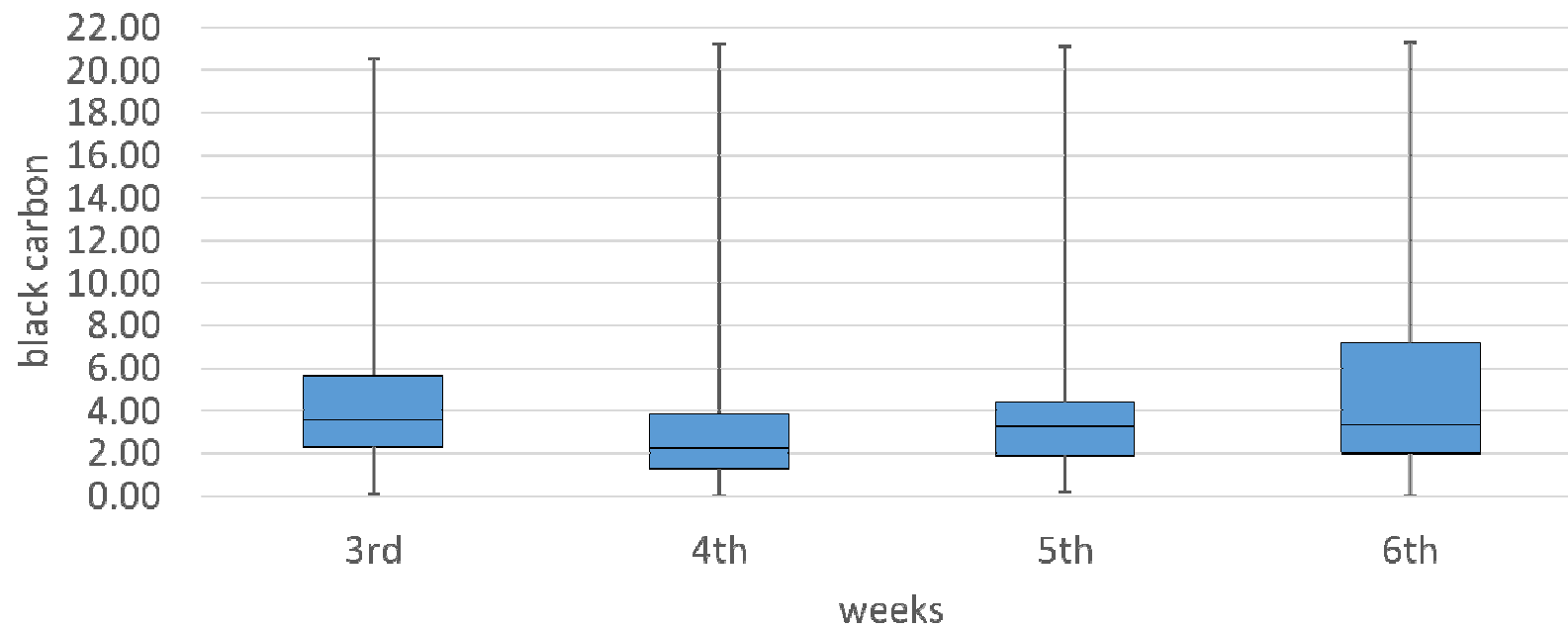
Collected Data - AirProbe

Weekly Activity



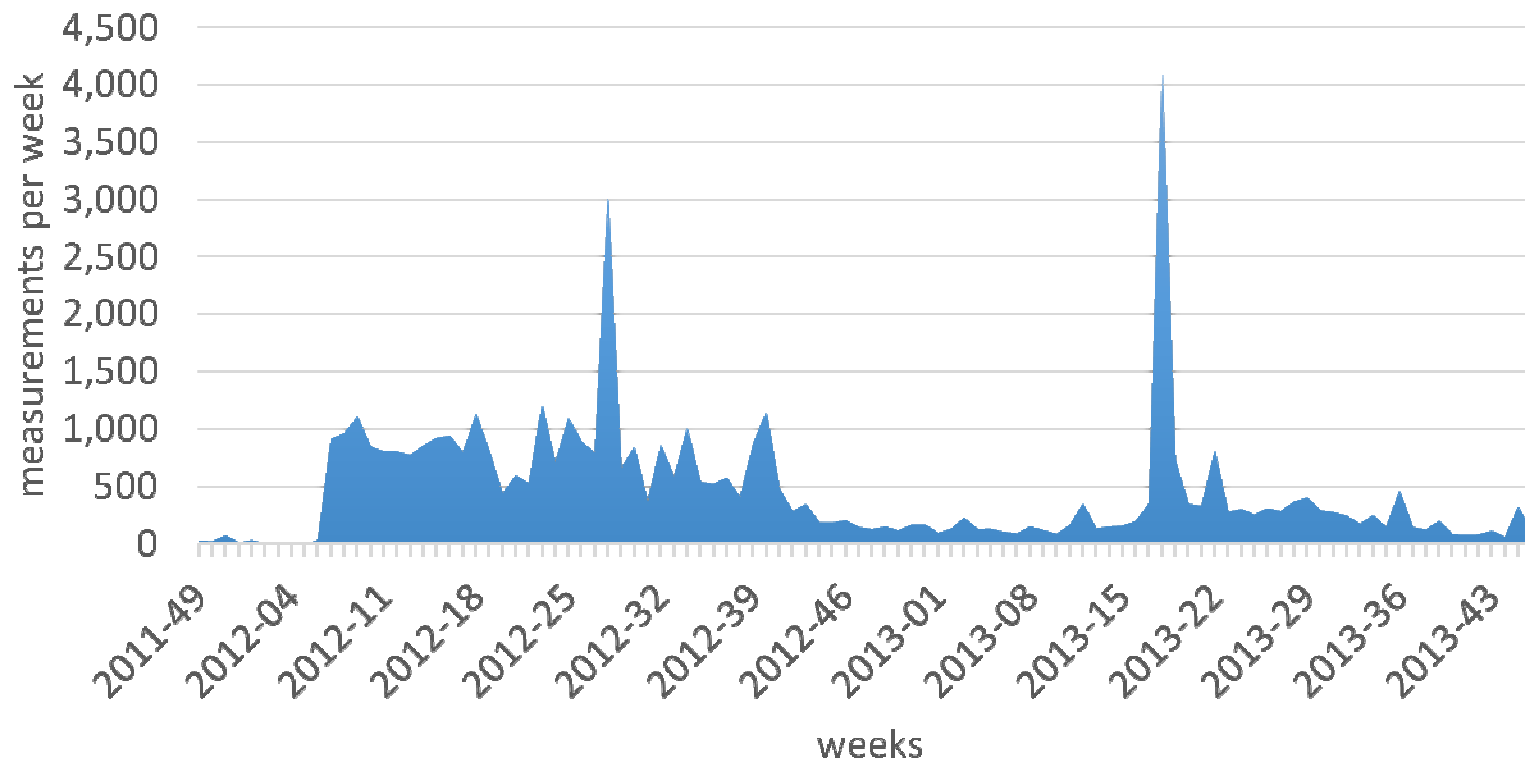
Collected Data - AirProbe

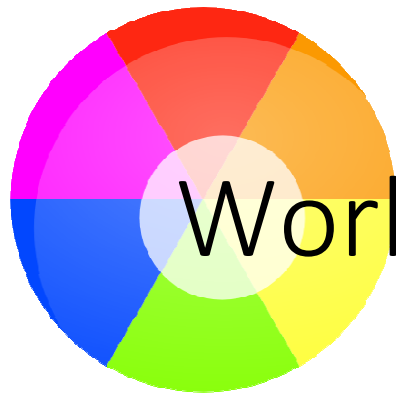
Black Carbon - APIC



Collected Data - WideNoise

Weekly Activity





World Canvas

spatial augmentation

