
Auto-tagging with machine learning

Lucy Kidd



About me



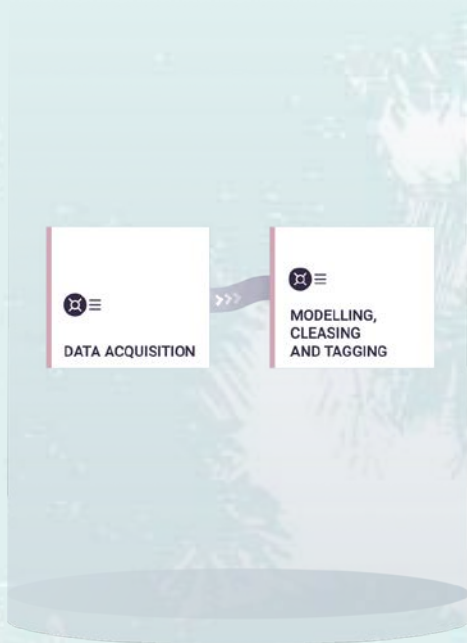
Lucy Kidd
Data Scientist at Bueno



Our product



Our product



Haystack tagging library is used to:

- Map each site to a common model
- Represent the complex relationships between point and equips
- Give meaning to a range of building systems

Data Collection & Structuring **Ringmaster**



Our product



Root cause analytics: Analytics which identify as close as possible to the root cause of an issue, without physical inspection of the equipment.

Analytics Platform

Forge

May 13-15, 2019



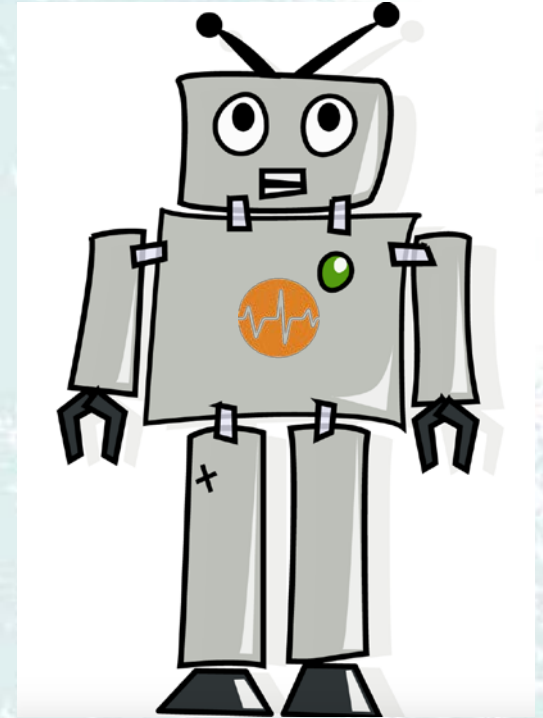
Challenges of tagging

- Each building has a lot of points that need tagging
- Labor intensive
- Human error
- Quality assurance
- Points getting more complex as we create new tags

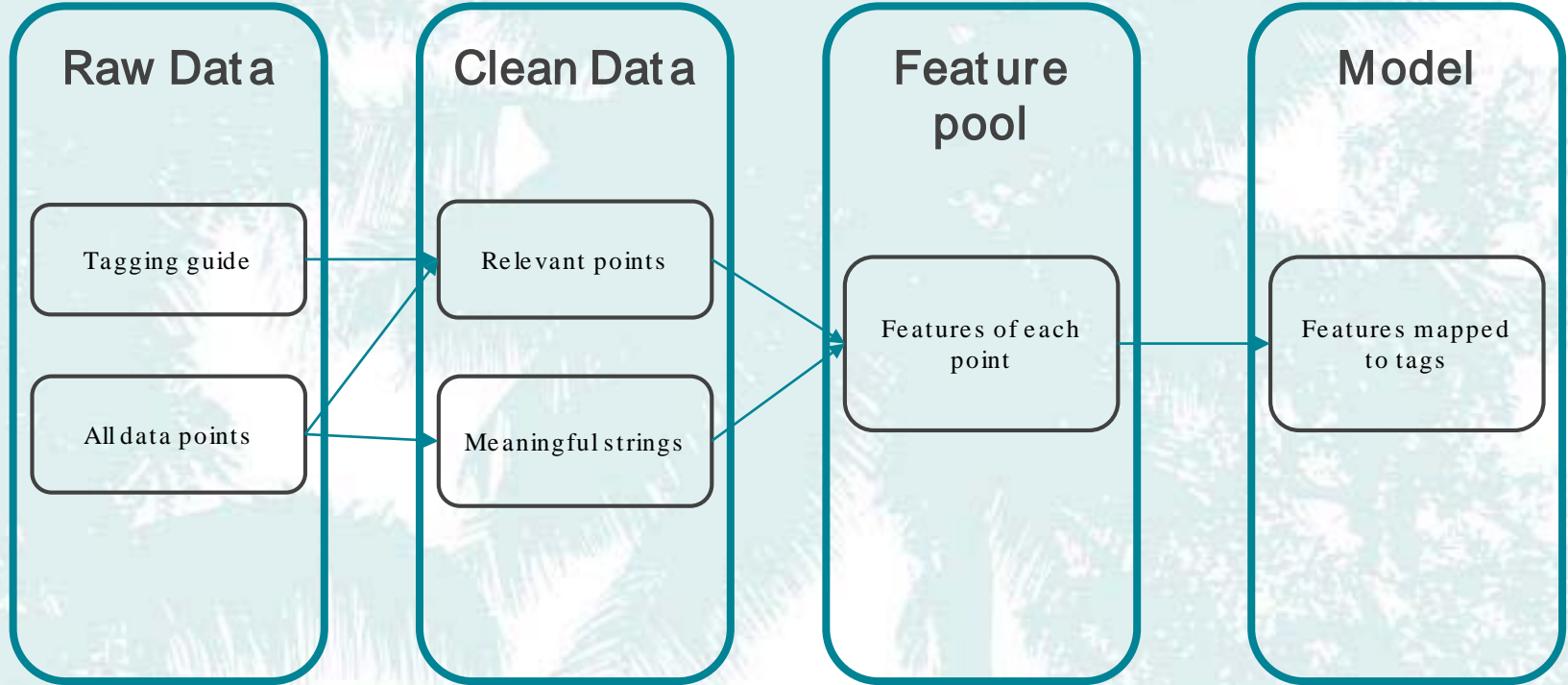


Solution: Unicorn

- Learns context for tags
- Suggests tags per point
- Deployments can easily accept or decline tagging suggestions



How Unicron Learns



How Unicron Learns

Raw Data

Clean Data

Feature
pool

Model

Point data

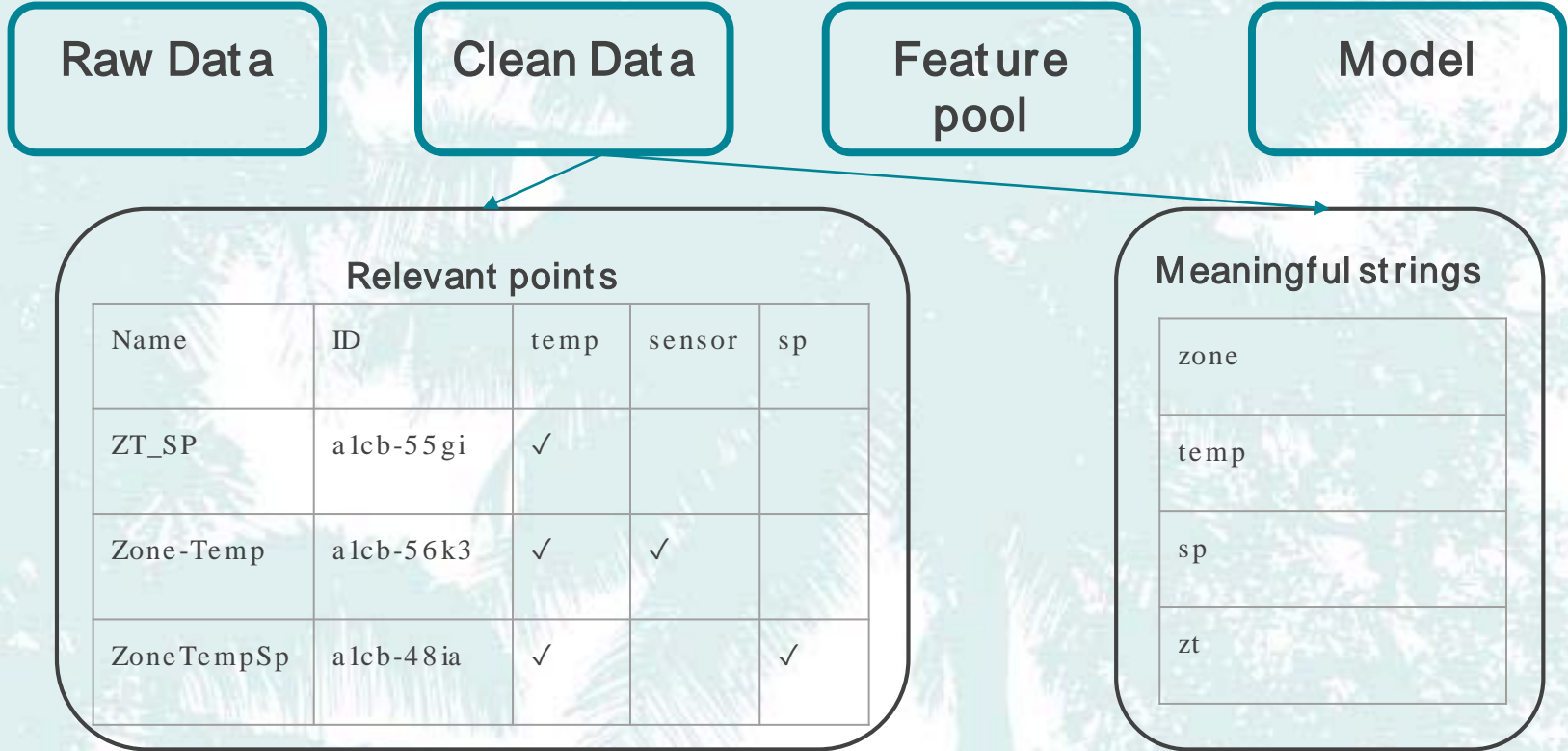
Name	ID	Temp	Sensor	untagged
ZT_SP	a1cb-55gi	✓		
Zone-Temp	a1cb-56k3	✓	✓	
sound_peak	a1cb-48ia			✓

Tagging guide

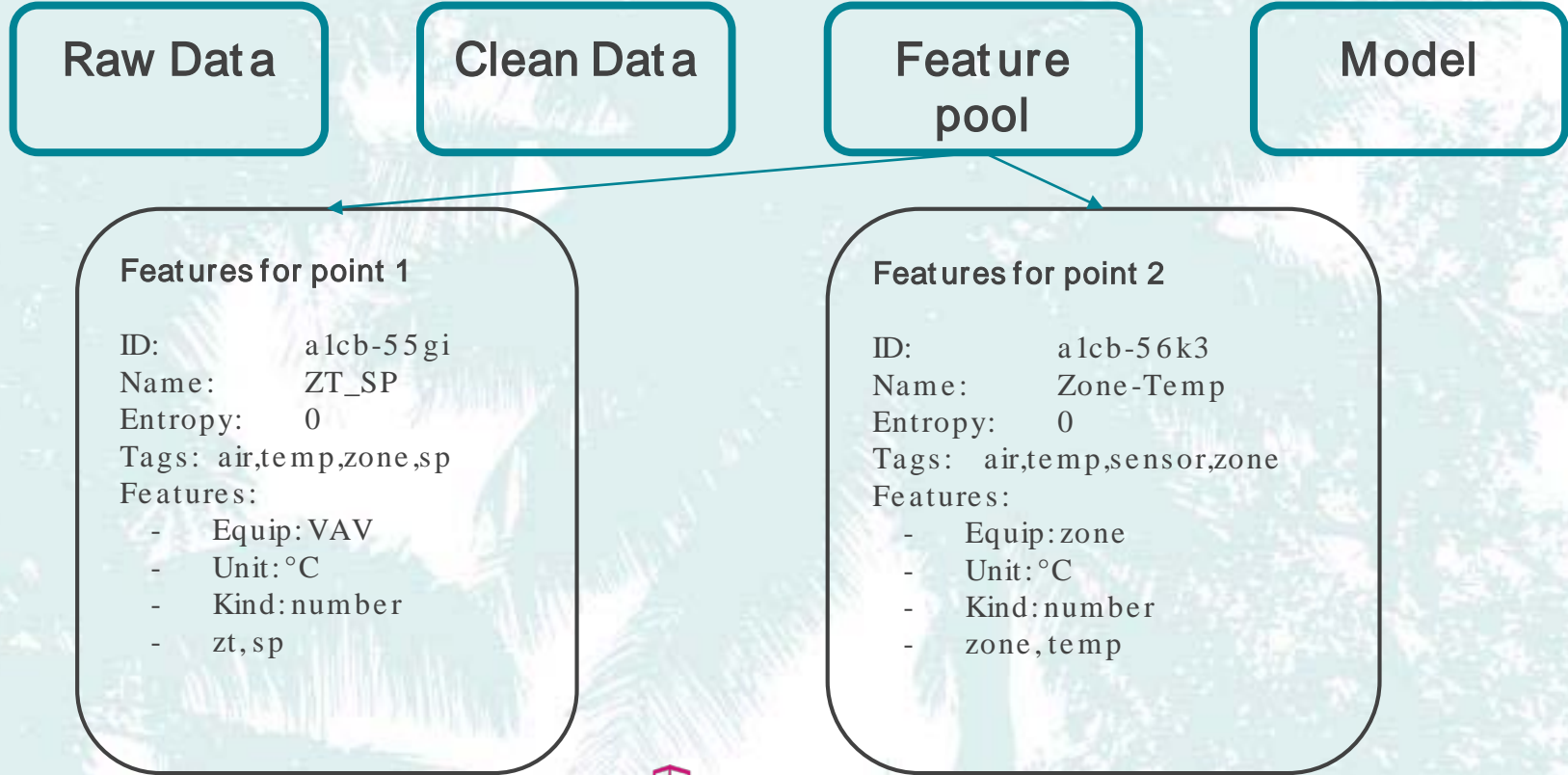
Point	Tags
Zone Temp	zone, air, temp, sensor
Zone Temp SP	zone, air, temp, sp
HHWV	heat, cmd



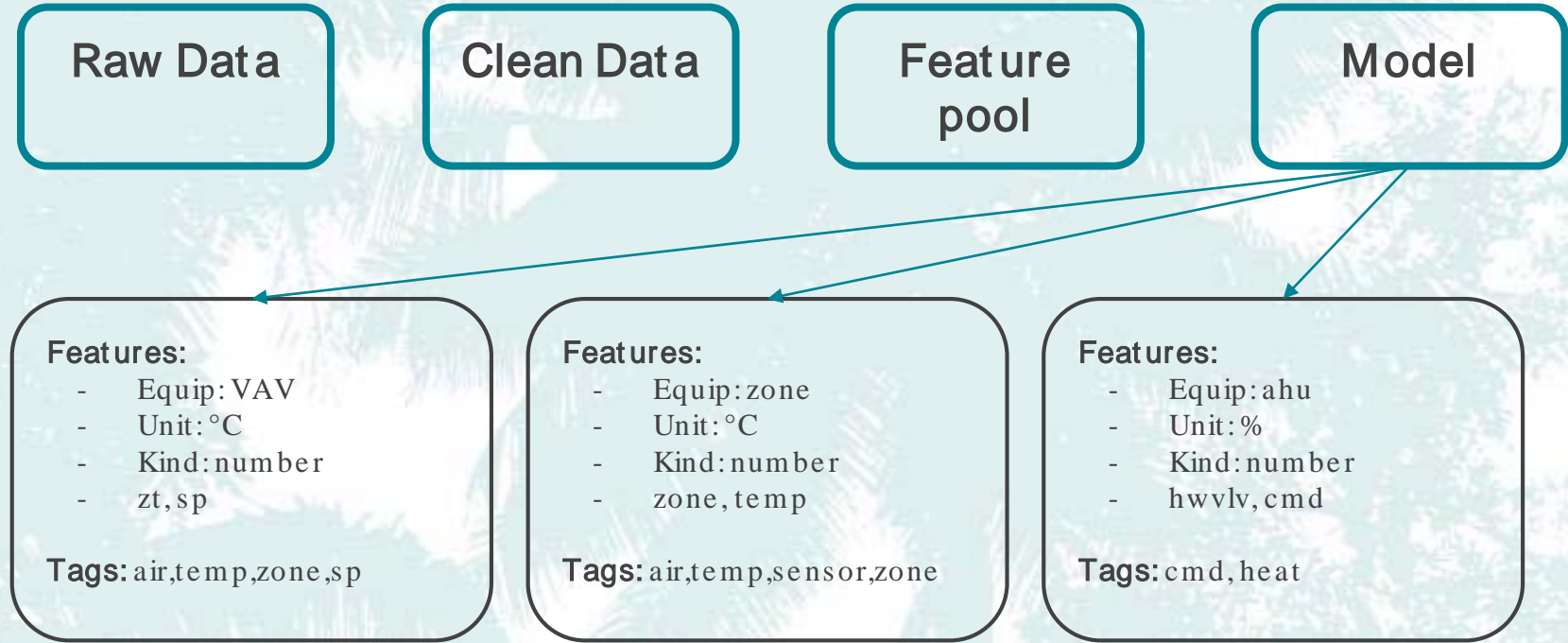
How Unicron Learns



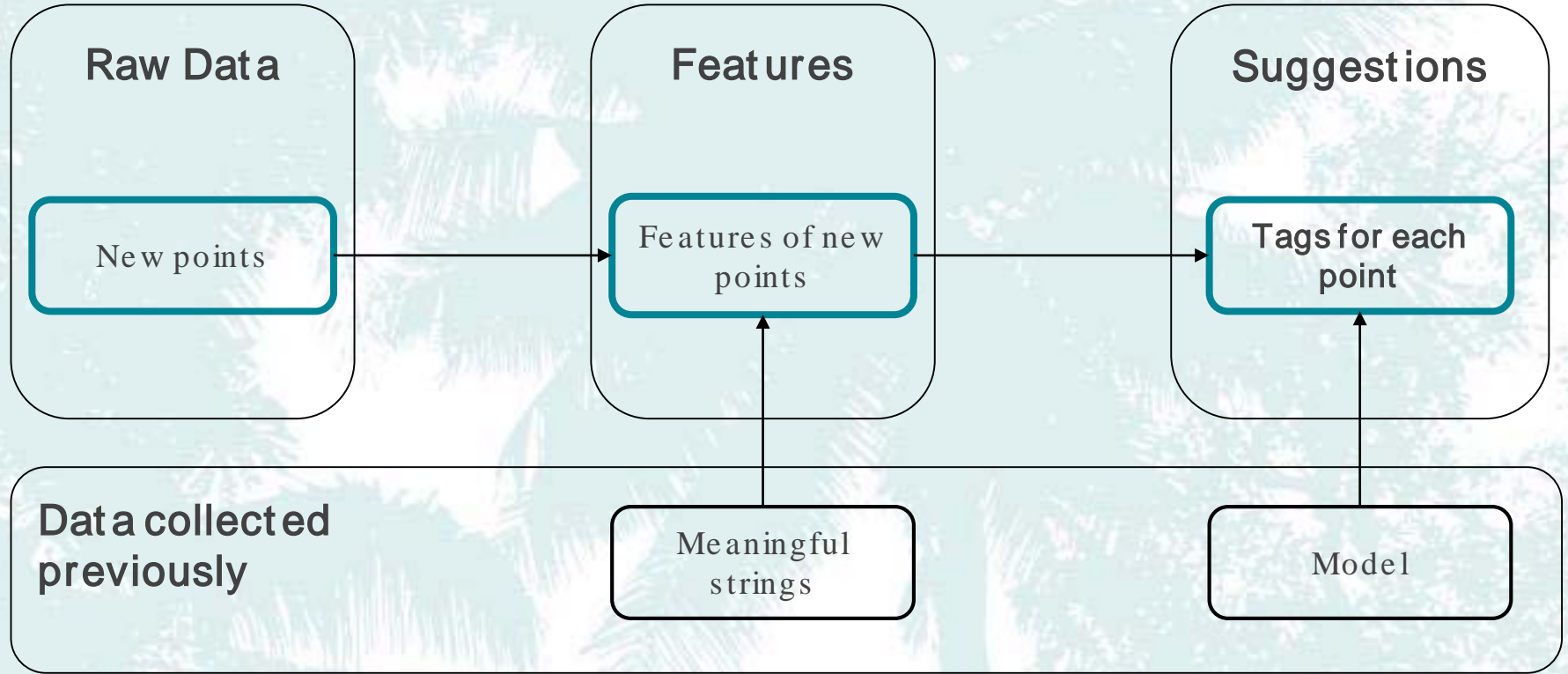
How Unicron Learns



How Unicron Learns



Matching points to tag sets



Matching points to tag sets

Raw Data

Features

Suggestions

New point 1

ID: a1cb-7832
Name: ZT_SP
EquipRef: AHU_1
hisEnd: 2019-02-06
Unit: °C
Kind: Number

New point 2

ID: a1cb-88gy
Name: HWVLV_CMD
equipRef: AHU_1
hisEnd: 2019-02-06
Unit: %
Kind: Number



Matching points to tag sets

Raw Data

Features

Suggestions

New point 1

ID: a1cb-7832

Name: ZT_SP

Entropy: 0

Features:

- Equip: AHU
- Unit: °C
- Kind: number
- zt, sp

New point 2

ID: a1cb-88gy

Name: HWVLV_CMD

Entropy: 0

Features:

- Equip: AHU
- Unit: %
- Kind: number
- hwvlv, cmd

Matching points to tag sets

Raw Data

Features

Suggestions

New point 1

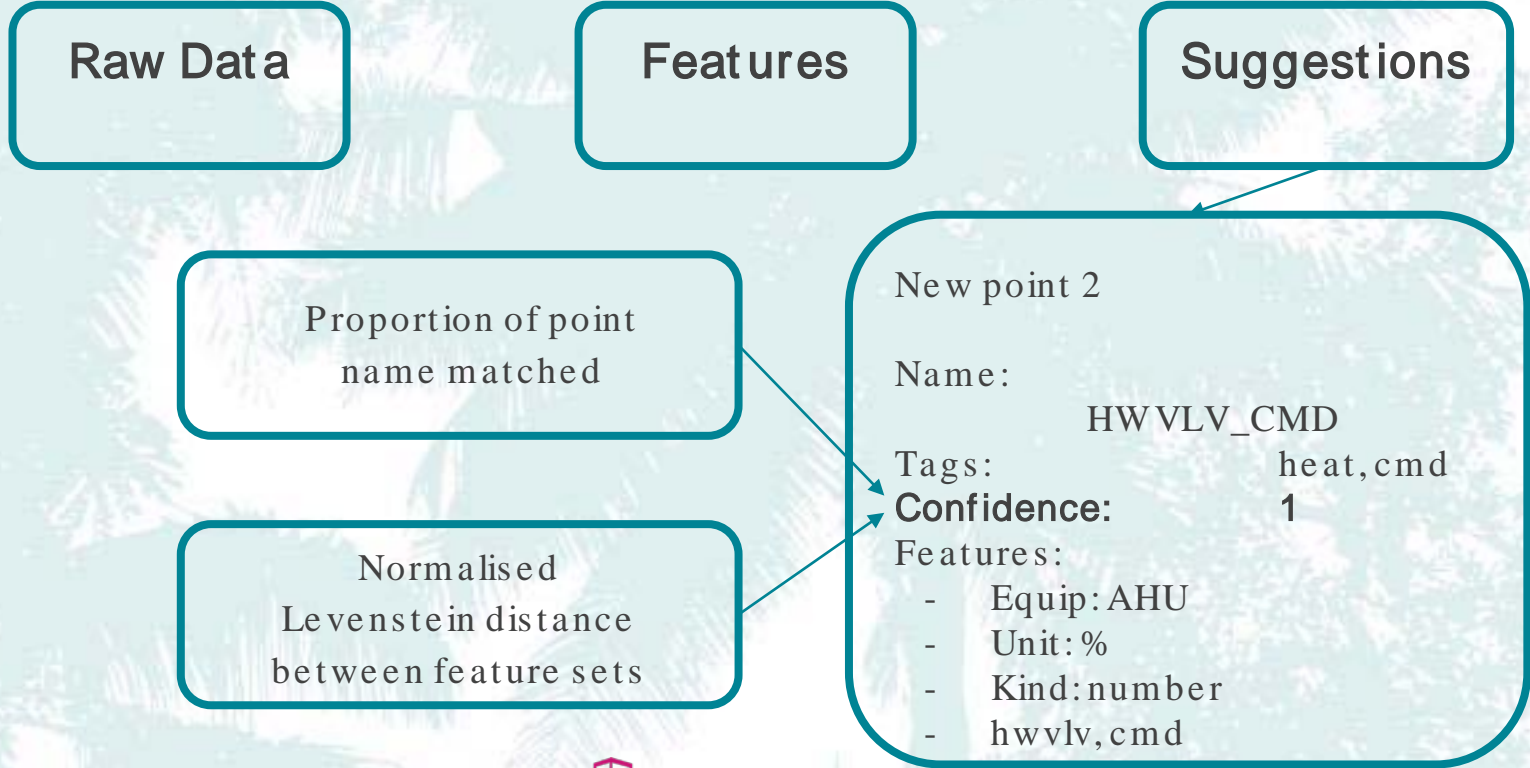
Name: ZT_SP
Tags: air, sp, temp, zone
Confidence: 1
Features:
- Equip: AHU
- Unit: °C
- Kind: number
- zt, sp

New point 2

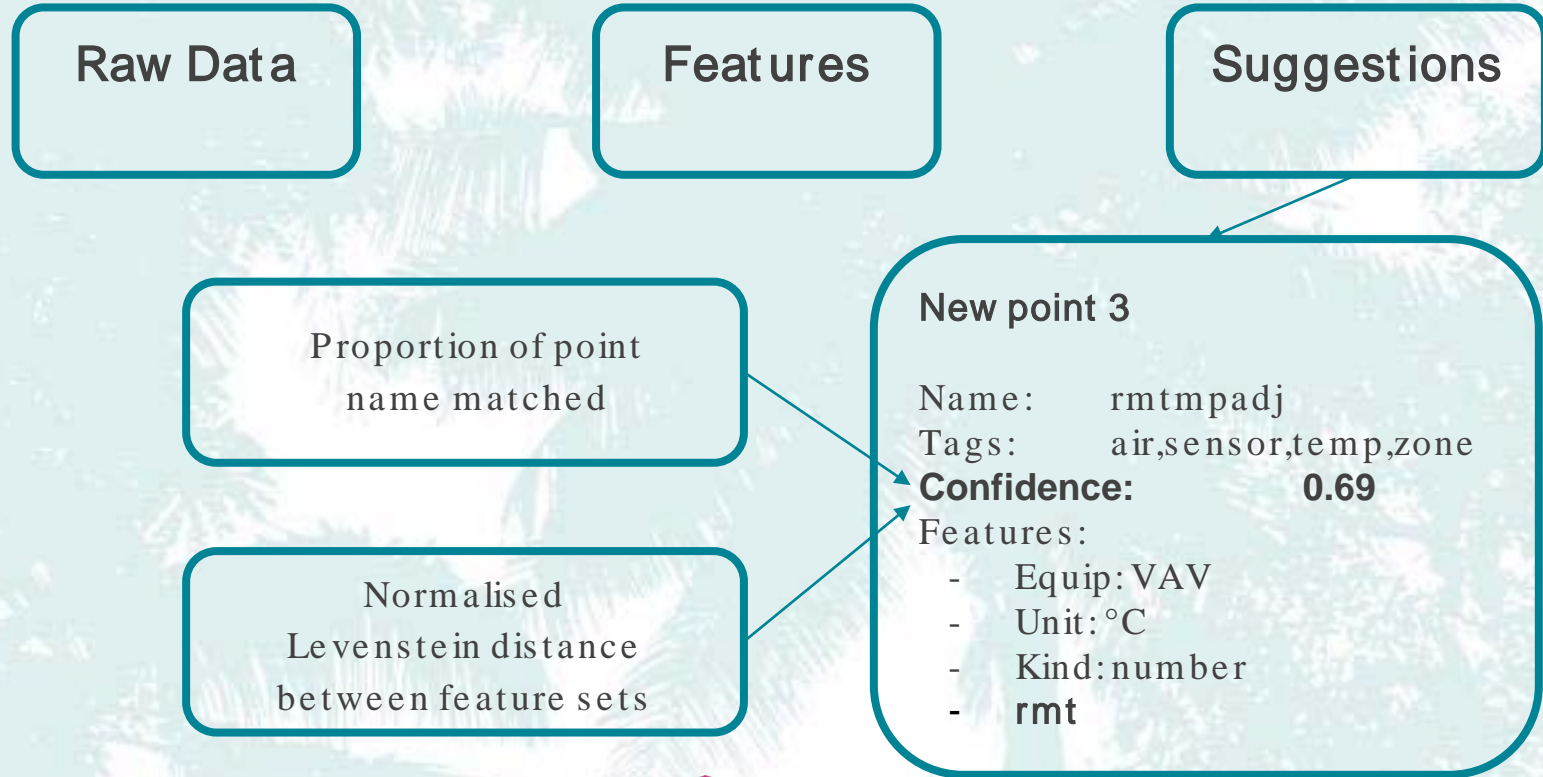
Name: HWVLV_CMD
Tags: heat, cmd
Confidence: 1
Features:
- Equip: AHU
- Unit: %
- Kind: number
- hwlv, cmd



Matching points to tag sets



Matching points to tag sets



How deployments use it

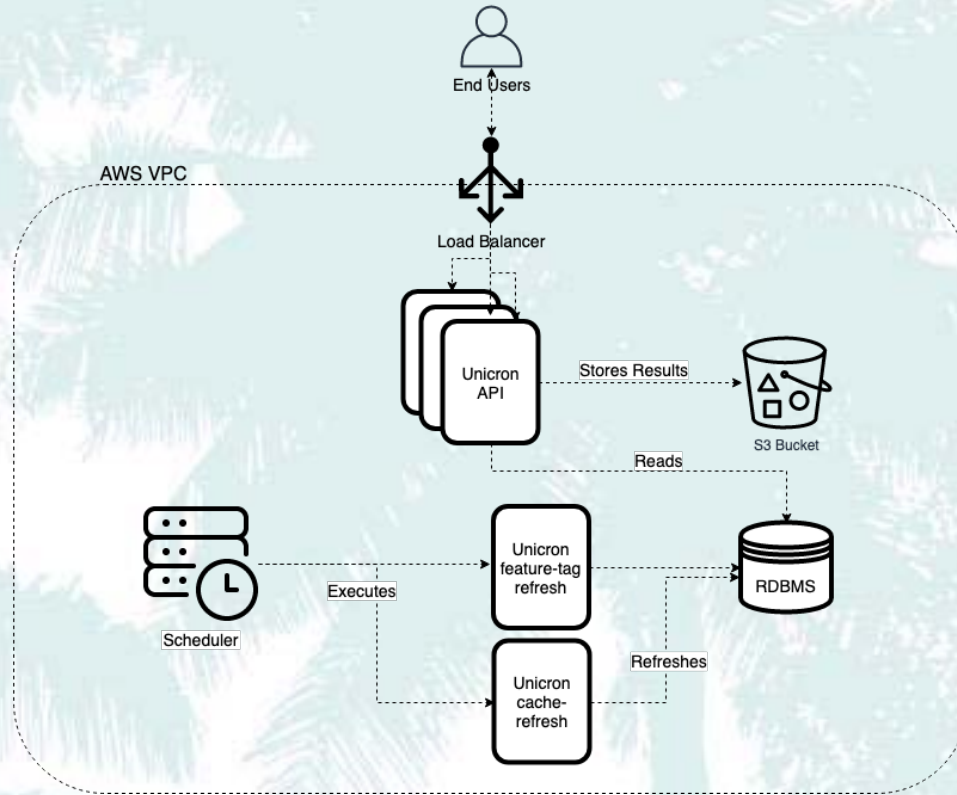
- Deployments tell bot what site they want to tag
- Bot delivers a suggestions
- Deployments will accept (or decline) suggestions
- Points on the site will be tagged with all accepted tags

Name: HWVLV_CMD
Tags: heat,cmd
Confidence: 1
Features:
- Equip: AHU
- Unit: %
- hwvlv,cmd
Members: 103
Accept: TRUE

Name: rmtmpadj
Tags: air,sensor,temp,zone
Confidence: 0.69
Features:
- Equip: VAV
- Unit: °C
- rmt
Members: 1
Accept: FALSE



Architecture



Results

- 60% less bugs in our analytics due to tagging issues
- Deployment time spent tagging has dropped by 50%
- Cheaper barrier to entry for clients



In Summary

- High quality tagging is essential for our analytics
- Manually tagging sites is unsustainable as we scale
- Automated tagging has allowed us to:
 - Speed up the tagging process
 - Improve the quality of our analytics
- Future direction:
 - Apply this to equips



Thank you

May 13-15, 2019

