ORGANIZED BY

FIWARE

“Adding an ‘S’ to IoT”

WOBCOM

SUPPORTED BY

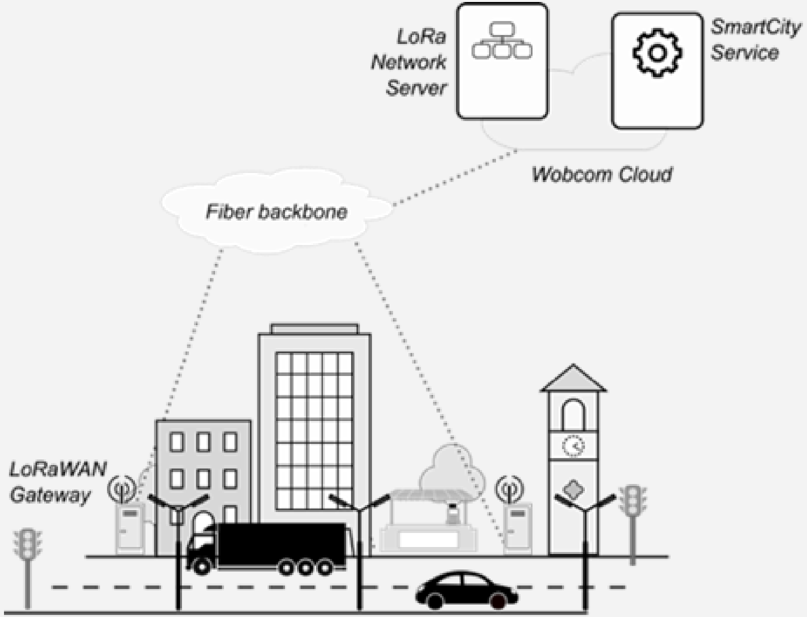
GUARD

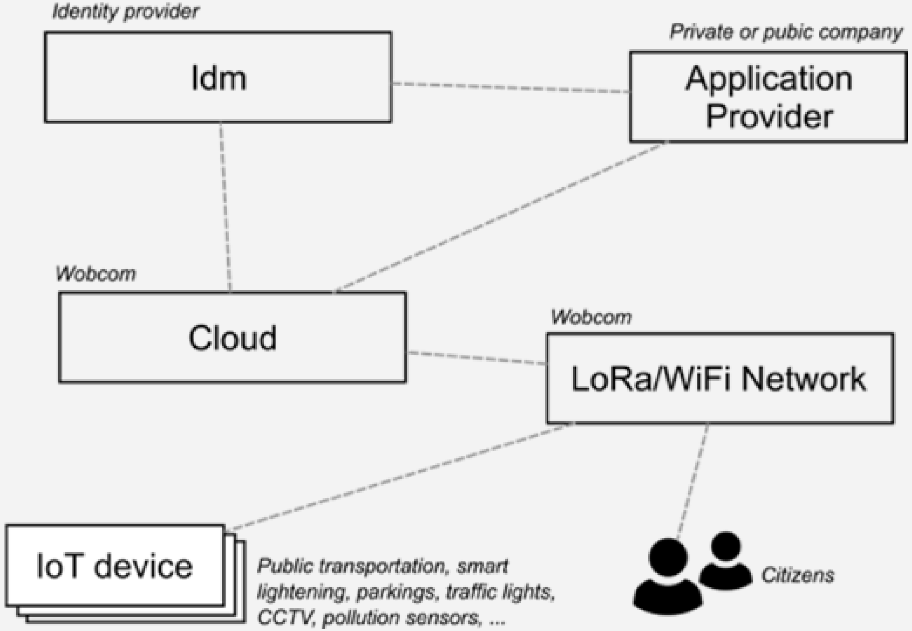
cyberwatching.eu
The European watch on cybersecurity & privacy

>Whoami

- Cornelio J. Hopmann (He/Him)
- Open Source Advocate
- Jumped on the cloud hype-train with OpenStack (7 years ago?)
- Did some Industrial IoT in Hamburg
- Joined Wobcom in 2019 to expand and manage the LoRaWAN Infrastructure

SmartCity: Mobility Use-Case



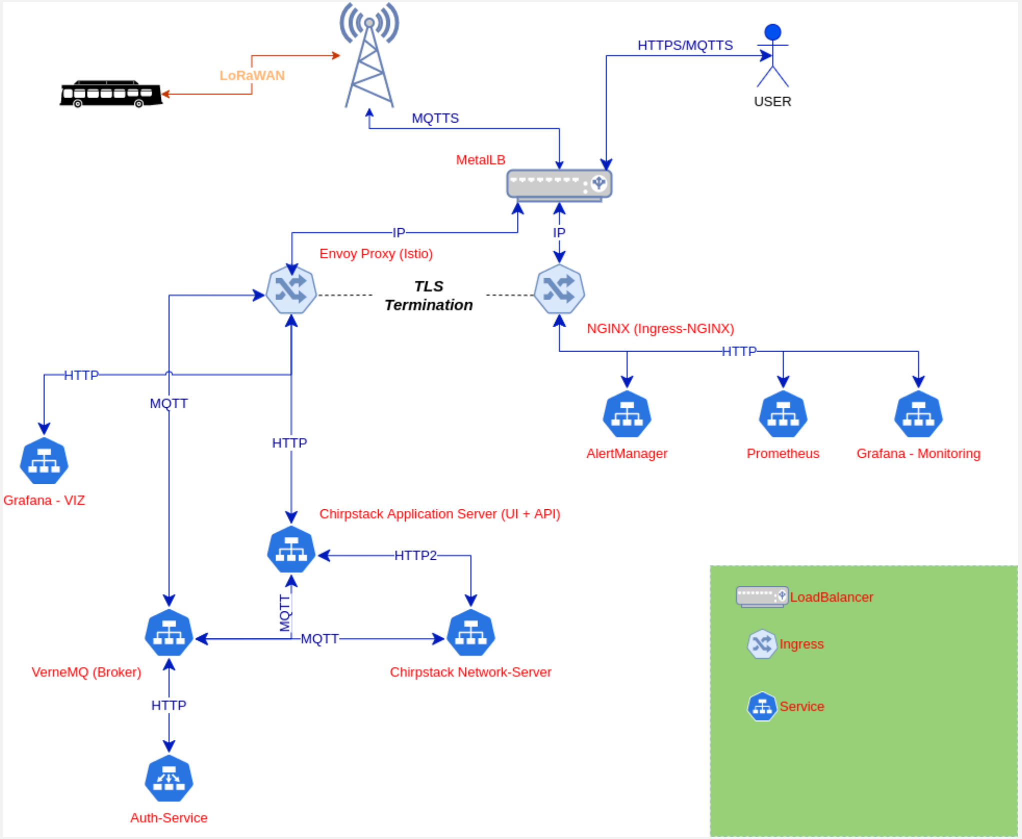


Application Description

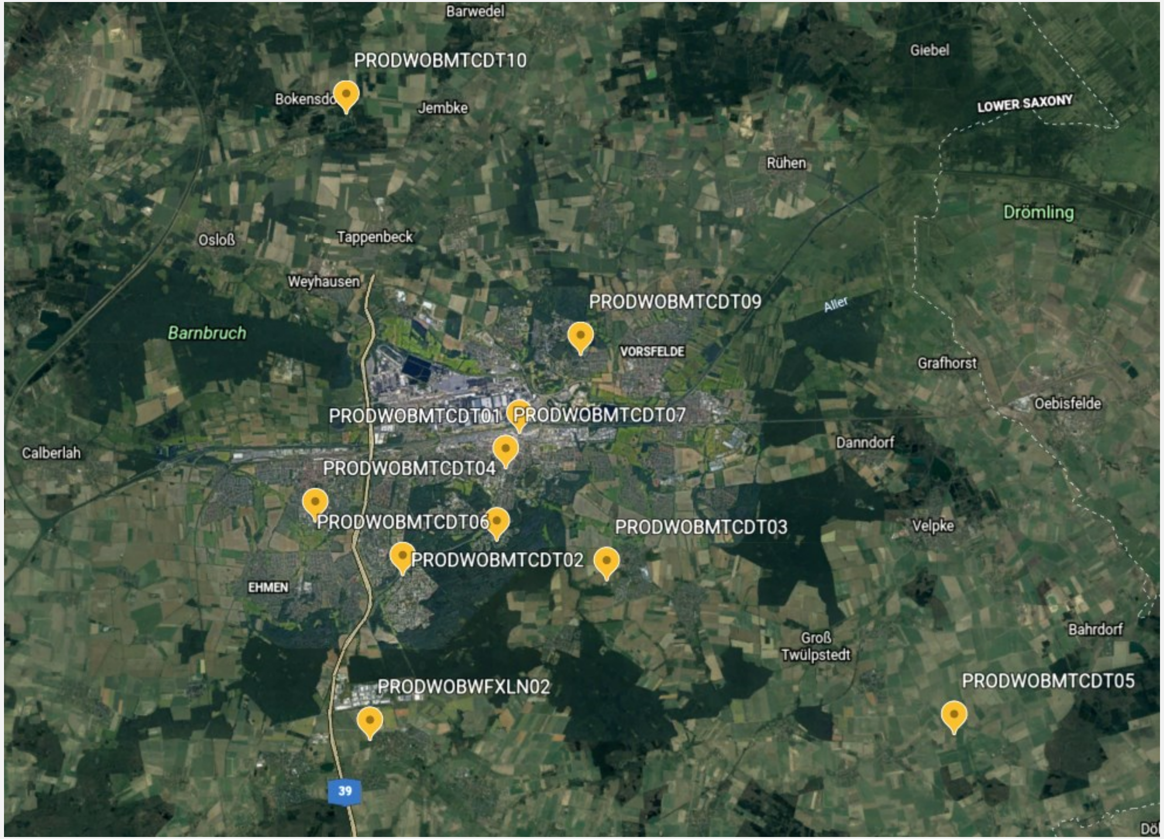
The application can be defined as a 3 Layer **IoT Stack**.

1. The data-collecting layer
   - Sensors inside the Buses
   - Sensors distributed around the City
2. The network layer
   - Long Range Wide Area Network (LoRaWAN)
   - WiFi/LTE Connectivity
   - Fiber-optics
   - Cloud Connectivity / Messaging Buses
3. The Information Layer
   - Application presented to the final consumers of the service
   - Context enriched M2M Interfaces

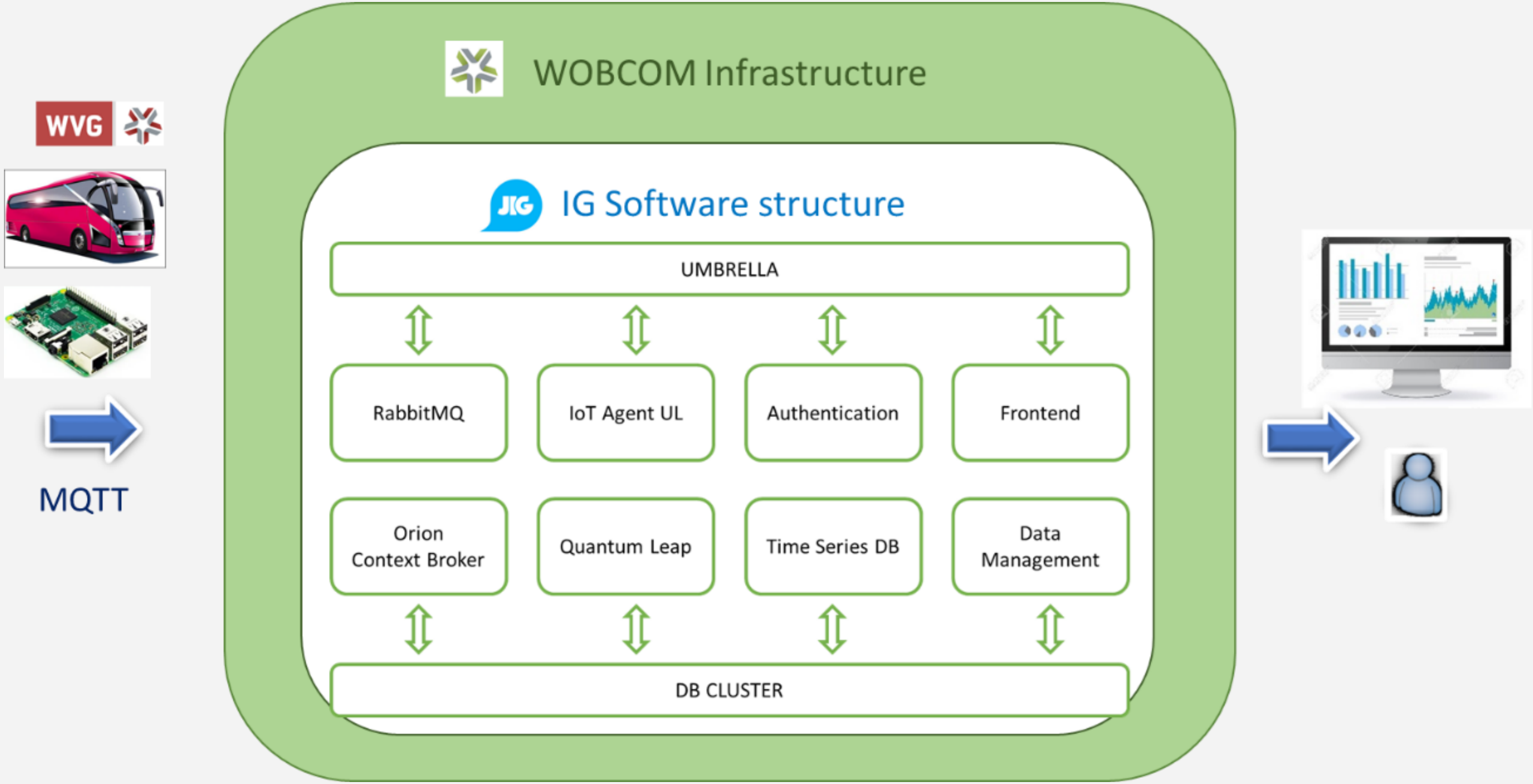
Application Description: Network Layer



Application Description: Network Layer



Application Description: Information Layer



WVG

MQTT

WOBCOM Infrastructure

IG Software structure

UMBRELLA

RabbitMQ

IoT Agent UL

Authentication

Frontend

Orion Context Broker

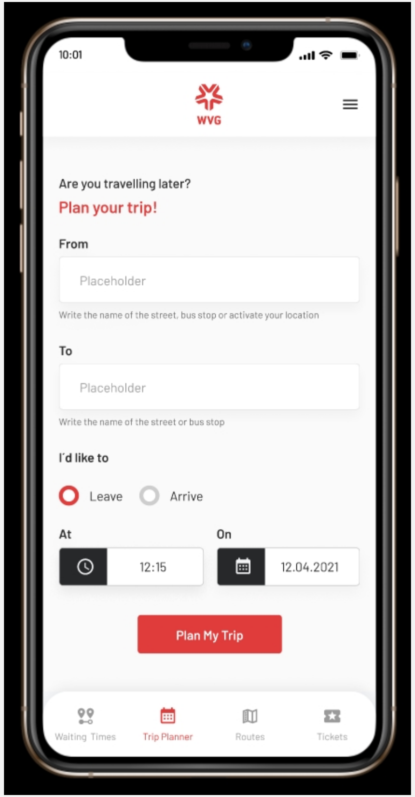
Quantum Leap

Time Series DB

Data Management

DB CLUSTER

Application Description: Information Layer



Are you travelling later?

Plan your trip!

From

Placeholder

Write the name of the street, bus stop or activate your location

To

Placeholder

Write the name of the street or bus stop

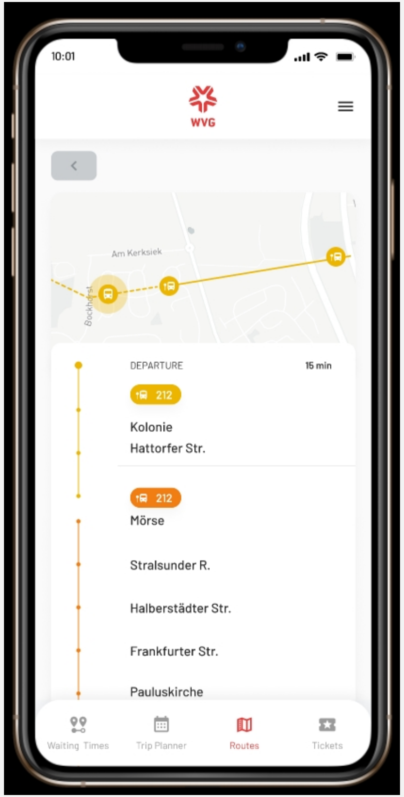
I´d like to

● Leave ○ Arrive

At: 12:15

On: 12.04.2021

Plan My Trip



DEPARTURE 15 min

212

Kolonie Hattorfer Str.

212

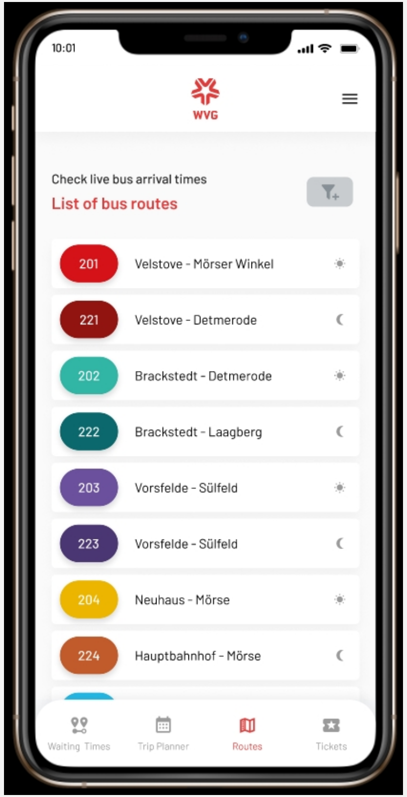
Mörse

Stralsunder R.

Halberstädter Str.

Frankfurter Str.

Pauluskirche



Check live bus arrival times

List of bus routes

201	Velstove - Mörser Winkel	☀
221	Velstove - Detmerode	☾
202	Brackstedt - Detmerode	☀
222	Brackstedt - Laagberg	☾
203	Vorsfelde - Sülfeld	☀
223	Vorsfelde - Sülfeld	☾
204	Neuhaus - Mörse	☀
224	Hauptbahnhof - Mörse	☾

The Issue

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Kids with Ski Mask!

On a more serious note:

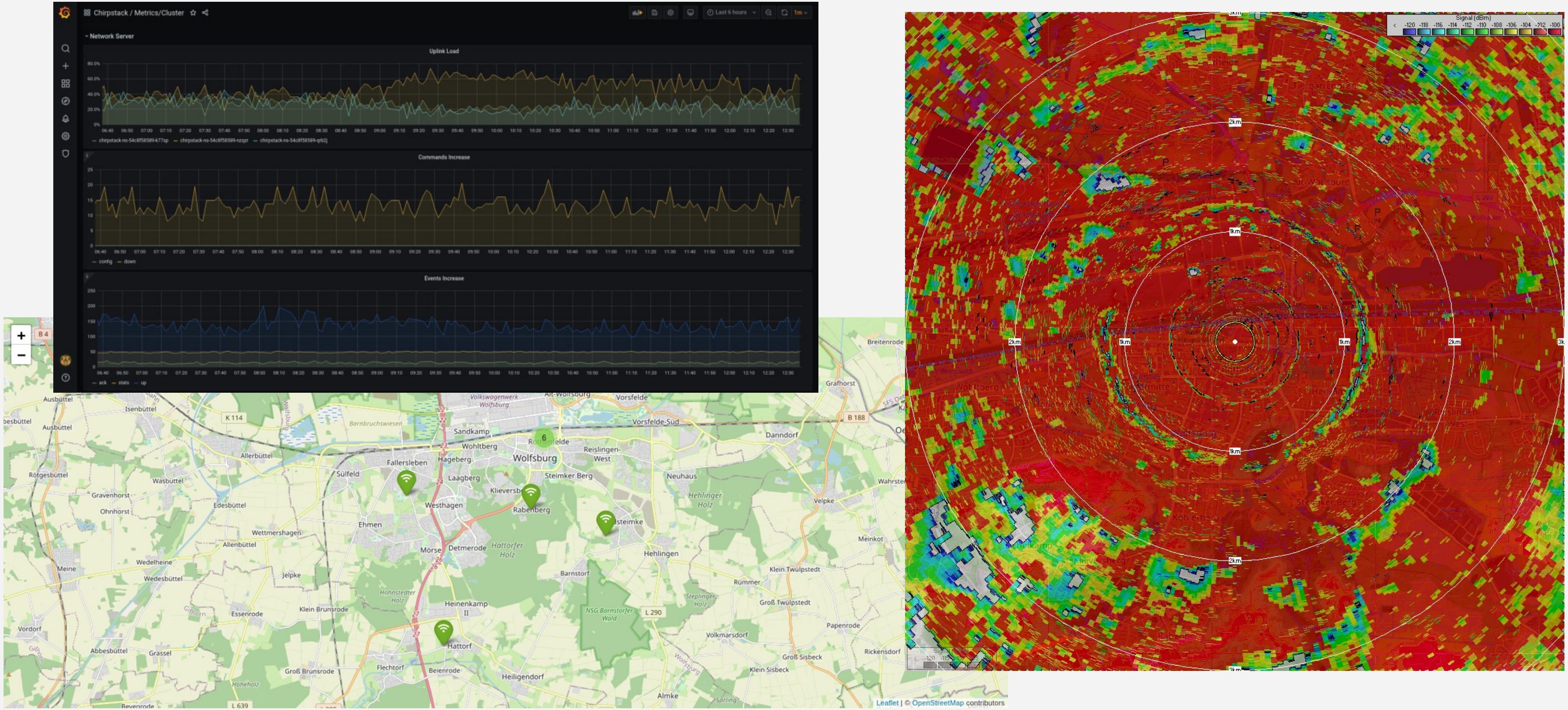
1. Gateways and Sensors installed around the city cannot be physically secured.
2. Public Radio-Spectrum
3. Multiple Providers, Vendors, Partners and User Groups
4. The “normal” “welcome to the jungle” Internet Threats

The missing “S”

How do we tackle those Issues?
How do we minimize Risk?

The missing “S”

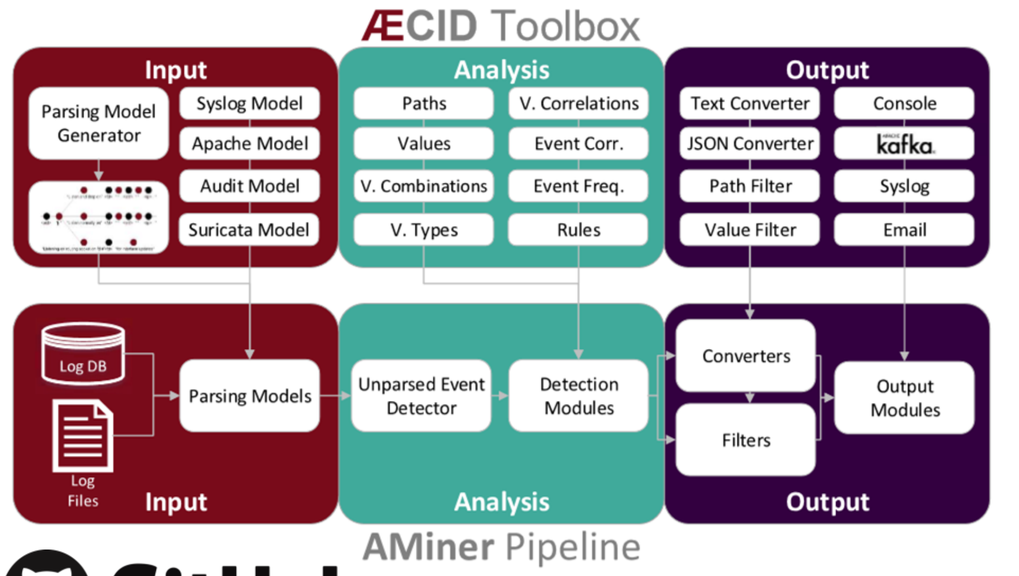
Plan, Monitor, Alert and React!


Chirpstack / Metrics/Cluster
Last 6 hours
1m
Network Server
Uplink Load
80.0%
60.0%
40.0%
20.0%
0%
06:40
12:30
chirpstack-ns-54c8f58589-k77sp
chirpstack-ns-54c8f58589-nzqzr
chirpstack-ns-54c8f58589-qrb2j
Commands Increase
25
20
15
10
5
0
config
down
Events Increase
250
200
150
100
50
0
ack
stats
up
Wolfsburg
Fallersleben
Vorsfelde
Sandkamp
Wohltberg
Hageberg
Laagberg
Sülfeld
Westhagen
Klieversberg
Rabenberg
Steimker Berg
Reislingen-West
Ehmen
Mörse
Detmerode
Hattorf
Heiligendorf
Heinenkamp II
Barnstorf
Hehlingen
Neuhaus
Danndorf
Velpke
6
Leaflet | © OpenStreetMap contributors
Signal (dBm)
-120 -118 -116 -114 -112 -110 -108 -106 -104 -102 -100
1km
2km
3km

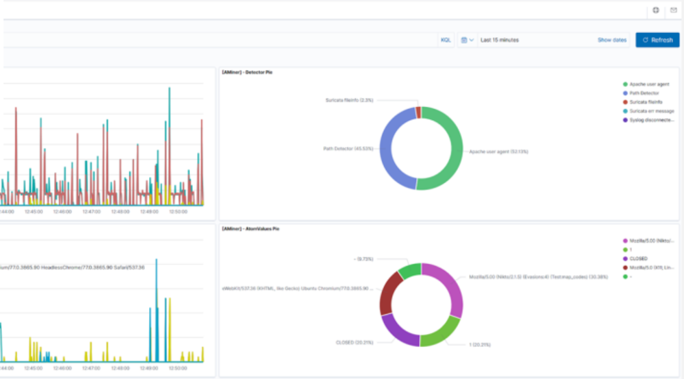
Self-learning ”Net Anomaly Detector”

1. Jamming (continuous, random, deceptive)
2. Battery drain
3. Grayhole
4. DDoS
5. Changes in the message size/rssi/message interval distribution which may indicate occurrence of the attack

AECID/AMINER



- Online log analysis
- Log-based anomaly detection
- Self-learning
- Open source



GitHub

https://github.com/ait-aecid/logdata-anomaly-miner

debian

GUARD integration: Expected Benefit

- The most tangible benefit will be improved service level agreements (SLA), also including strong security features that can be defined by each actor.
- While Wobcom as infrastructure provider will be mostly concerned about the availability and integrity of their infrastructures, JIG as service provider will care about the reliability, continuity, and trustworthiness of their operation, WVG as an (end) user cares about a high-level experience without being locked into a proprietary platform.

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THANK YOU FOR LISTENING!

cornelio.hopmann@wobcom.de
https://github.com/chopmann
https://gitlab.com/hopmann

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