



Insights from a Skylight Super User

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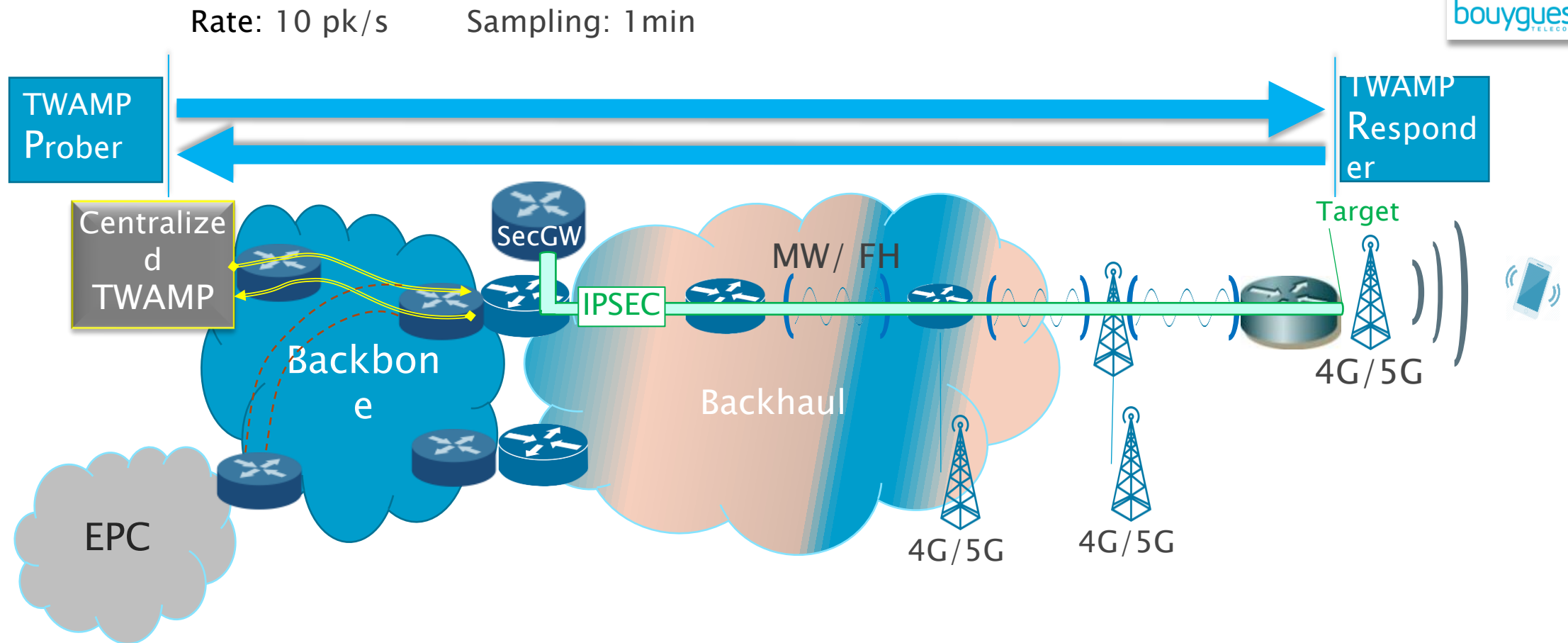


SKYLIGHT @ BYTEL – 1 / 2

- Initial deployment in 2017 – 15k sessions targeting 4G mobile
- Centralized architecture
- Early adoption of Analytics
 - Over 150 active users
 - Enriched with 78 metadata
 - Topology
 - GPS coordinates
- Skylight TWAMP performance monitoring in 2023 targets: Mobile 4G&5G, Fixed Broadband, Mobile Backbone and Enterprise Backbone w/ pt2pt NFV
- Almost 90k TWAMP sessions

SKYLIGHT @ BYTEL – 2/2

Mobile TWAMP Architecture



THE NECESSARY INGREDIENTS :

- Scalable launch platform to send TWAMP sessions
- Efficient roll-out of TWAMP Responders (built-in or with SFPs)
- Clear and precise vision of target NEs and which services/QoS need to be tested
- Confidence in the quality and pertinence of the results

● Ability to visualize and analyze PM results =>

● Integrate Skylight into your ecosystem

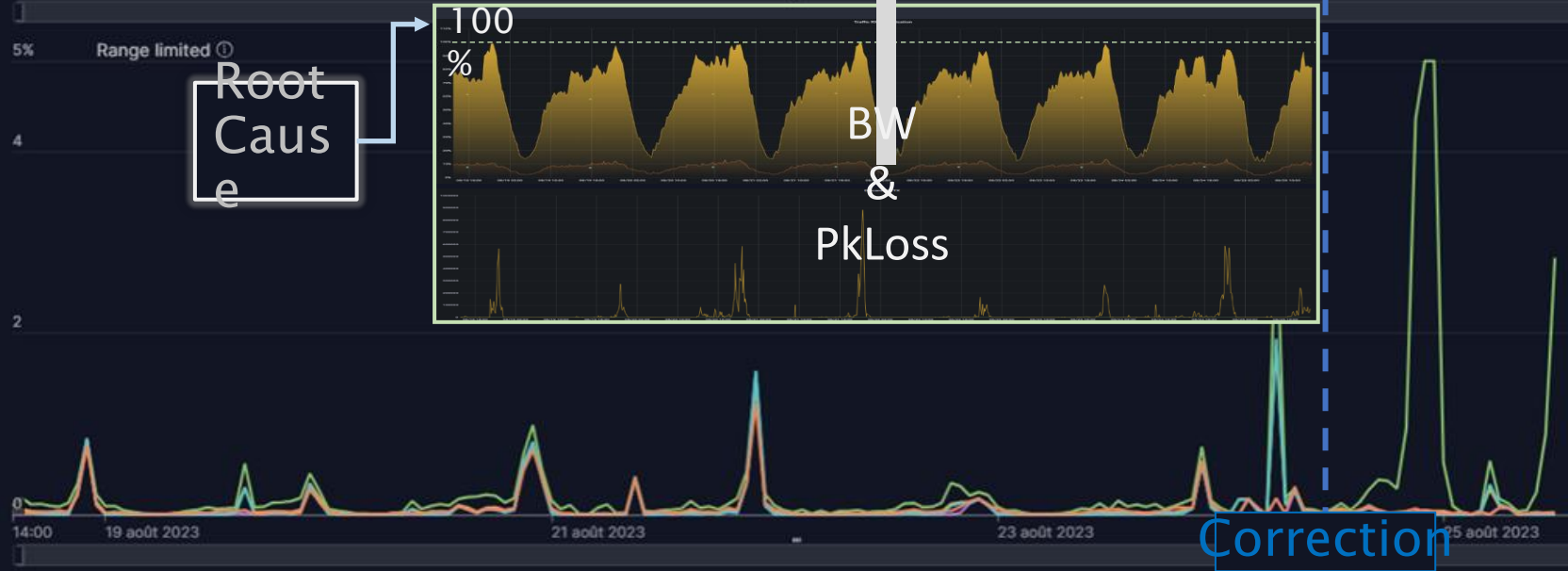
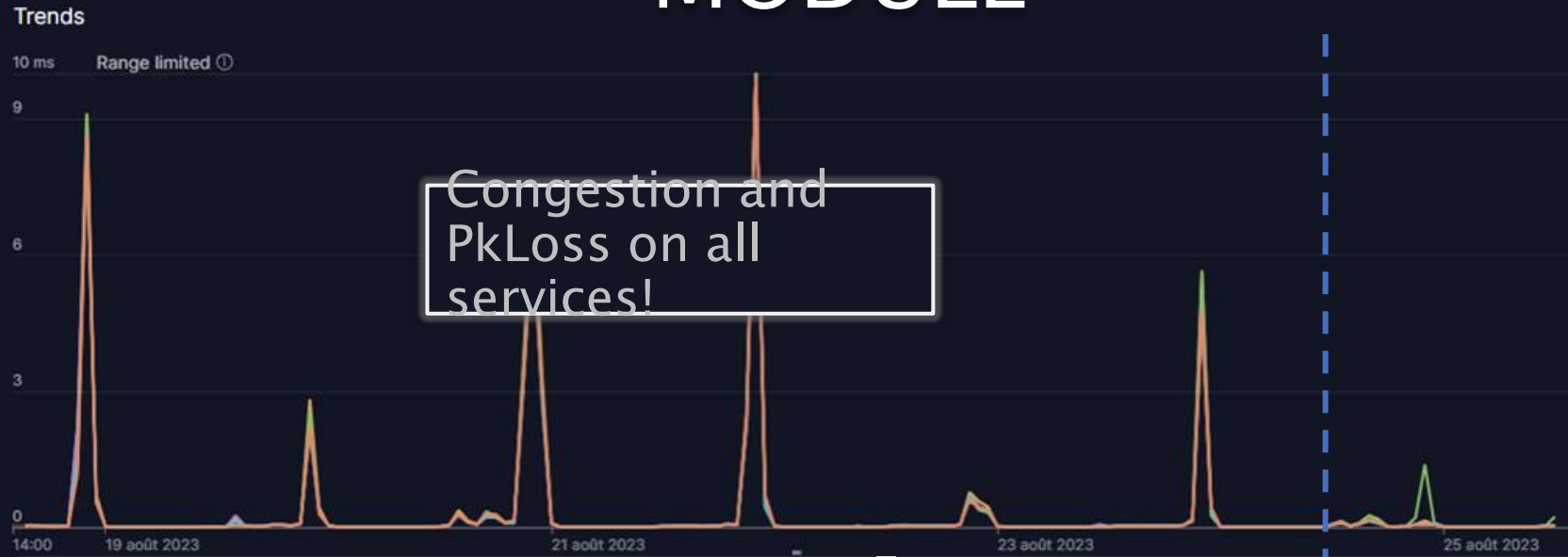
- Develop API tools and scripting to update target
- Send PM results to other internal tools
- Invest on software development to explore specific data science capabilities



NEW ANALYSIS

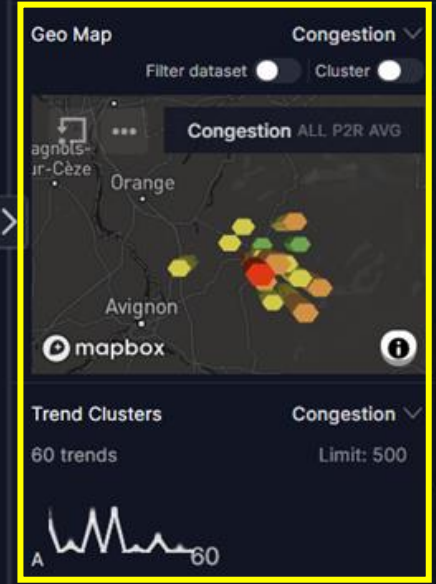
MODULE

equipment_type 3 Selections destination 26 Selections



| Congestion | | ALL |
|-------------------------|-----|----------|
| service | P2R | AVG |
| Dataset 60 | | 0.348 ms |
| data_4g_bytel_af22 22 | | 0.368 ms |
| box_4g_be 12 | | 0.358 ms |
| sig/sync_cs7 4 | | 0.334 ms |
| volte_cs6 21 | | 0.325 ms |
| data_4g_sfr_cs1 1 | | 0.323 ms |

| Packet loss % | | ALL |
|-------------------------|-----|--------|
| service | P2R | AVG |
| Dataset 60 | | 0.130% |
| data_4g_bytel_af22 22 | | 0.084% |
| box_4g_be 12 | | 0.345% |
| sig/sync_cs7 4 | | 0.053% |
| volte_cs6 21 | | 0.071% |
| data_4g_sfr_cs1 1 | | 0.067% |



TOPOLOGY

TOPOLOGIE / CartOSA v3 ☆ 🔗

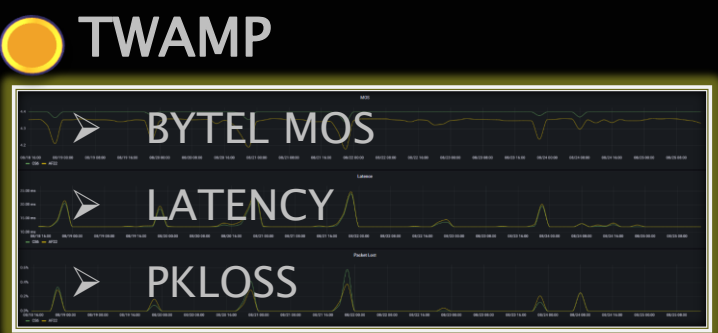
CartOSA

Perimetres path Nodes FHT3057 0 Enodeb all Alarms [x] All

Versions 2023-07-19 Depth 12

Canvas 3D

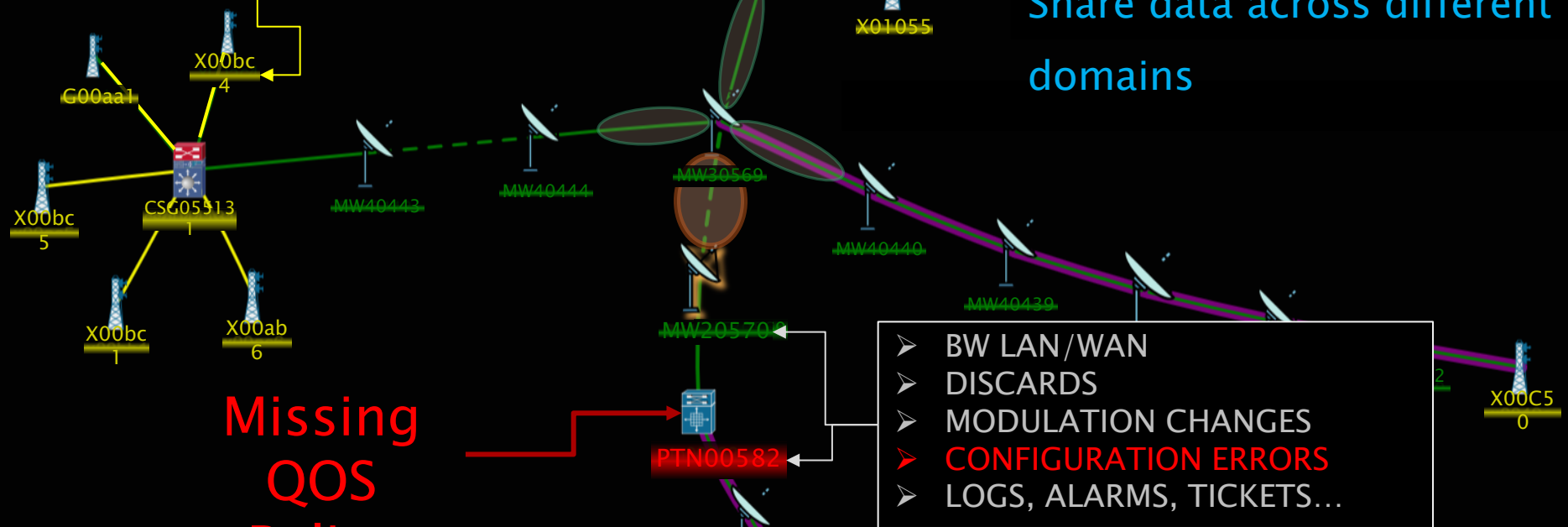
- Grafana
- Data sources
- » TWAMP
- » LLDP
- » Route Tables
- » DB / Ref
- » SNMP



CARTOSA => INTERNAL BYTEL TC

DEV => INTERNAL

PRODUCT OWNER => MOHAND SOUSSI



Built with open source ✓

Share data across different domains ✓

Missing QoS Policy

- ▶ BW LAN/WAN
- ▶ DISCARDS
- ▶ MODULATION CHANGES
- ▶ CONFIGURATION ERRORS
- ▶ LOGS, ALARMS, TICKETS...

* : all NE names have been modified

BANDWIDTH & PKLOSS



BW & PkLos

Available for all interfaces within the backhaul network



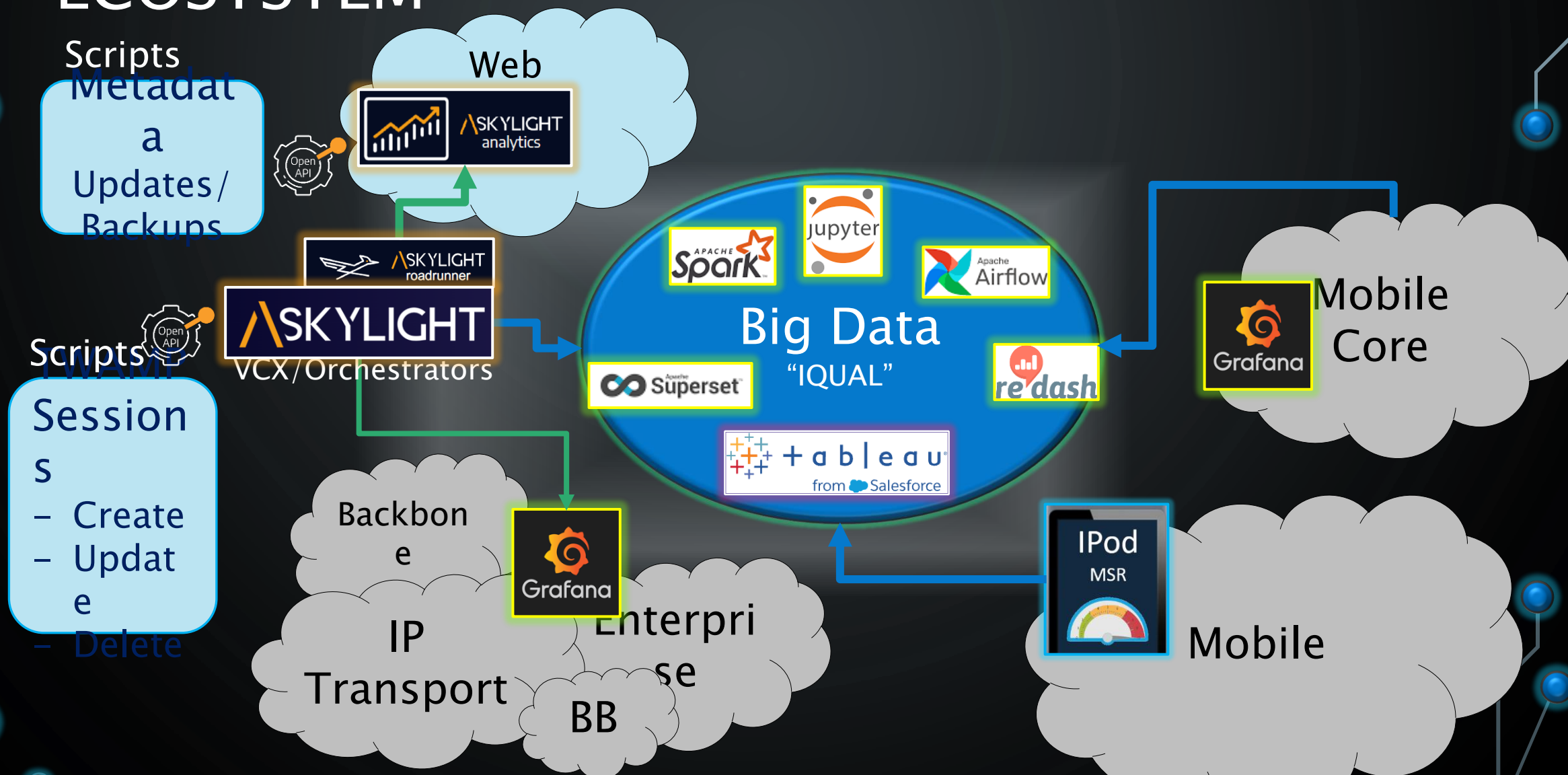
IF YOU SEE PKLOSS IT'S ALREADY TOO LATE!



Required BW = Current BW + PkLoss + Surpressed BW + Bursts

Waiting to confirm that BW curves have flattened or reached 100% is no way to guarantee network OoS.

BYTEL ECOSYSTEM



Scripts
Metadata
a
Updates/
Backups

Web
SKYLIGHT analytics

Scripts
Session
- Create
- Update
- Delete

SKYLIGHT
VCX/Orchestrators

Big Data
"IQUAL"

Mobile Core

Enterprise
BB

Mobile

Open Source Internal ByTel 3rd Party Software

INNOVATE! – WHAT WORKED FOR US

CORRELATING TWAMP RESULTS WITH RADIO ALARMS & CLUSTERING

3 types of alerts calculated:

Daily Saturation Alert

Threshold : **>2H** with **PkLoss > 0.5%** and **DelVarP25 > 2ms**

- DBSCAN applied on DelVarP25, signature is unique which avoids false positives

Daily Packet Loss

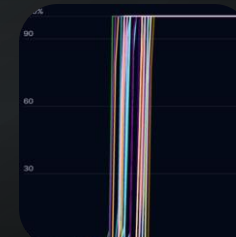
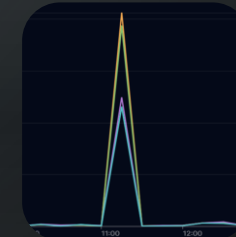
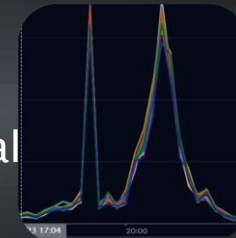
Threshold : **>17Min** with **PkLoss > 5%**

- DBSCAN applied on PkLoss, relatively effective but geographical data is used as an additional verification, to make sure cluster is coherent

Daily Unreachable

Threshold : **>40Min** with **PkLoss > 50%**

- DBSCAN applied on PkLoss, relatively effective but geographical data is used as an additional verification, to make sure cluster is coherent



SKYLIGHT
Analytics

Analytics was instrumental in defining thresholds, optimizing DBSCAN sensitivity and making sure clusters were coherent and caused by a unique root cause.

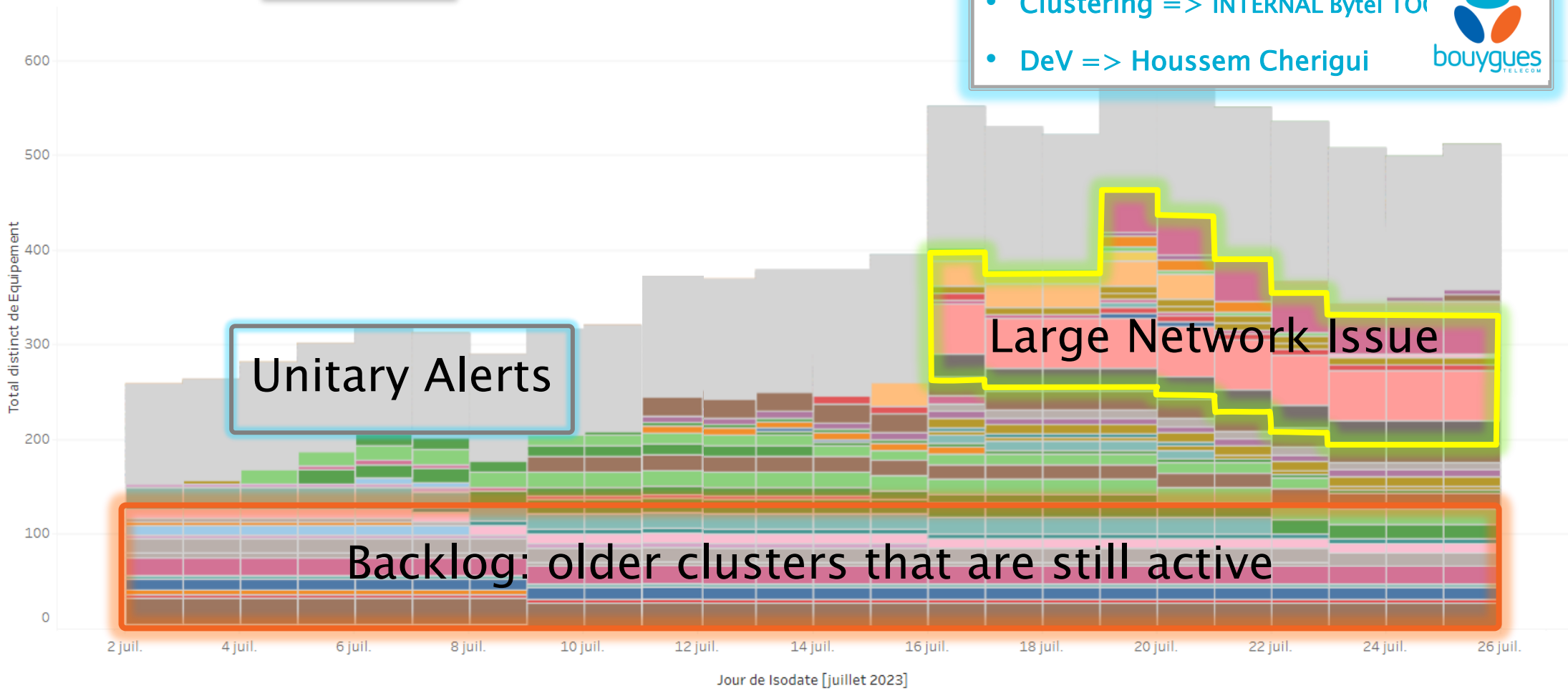
30-40% correlation => alert suppression => Cost Benefits (€)
Avoids investigating issues on radio nodes, caused by IP backhaul and under investigation.

VISUALIZING NETWORK SATURATIONS AS CLUSTERS

Tableau

SAT Cluster - Locked

- Clustering => INTERNAL Bytel TOC 
- DeV => Housseem Cherigui 



Cluster Id

- 20230718_SAT_2
- 20230718_SAT_0
- 20230717_SAT_0
- 20230716_SAT_6
- 20230715_SAT_9
- 20230715_SAT_5
- 20230715_SAT_10
- 20230715_SAT_1
- 20230714_SAT_1
- 20230713_SAT_8
- 20230713_SAT_11
- 20230713_SAT_10
- 20230713_SAT_1
- 20230712_SAT_4
- 20230712_SAT_3
- 20230712_SAT_2
- 20230712_SAT_1
- 20230712_SAT_0
- 20230710_SAT_2
- 20230710_SAT_0
- 20230709_SAT_6
- 20230709_SAT_5
- 20230709_SAT_4
- 20230709_SAT_2
- 20230709_SAT_11
- 20230709_SAT_0
- 20230708_SAT_2

Isodate

4 dernières semaines

MOVING FORWARD

- Keep Skylight integrated into the ByTel IT ecosystem
- Invest in Big Data, Data Mining and Data Science
- Key Objectives:
 - Reduce unnecessary investigations
 - Improve and rationalize our tool ecosystem
 - Let different business units integrate and develop new applications with Skylight results
- Keep Skylight Performance Analytics as our default tool to analyze PM results

Quality/Monitoring)

Single tool to analyze and validate results



SKYLIGHT
Analytics