

CALLMEMAYBE EFFICIENCY'S OPERATOR ANALYSIS

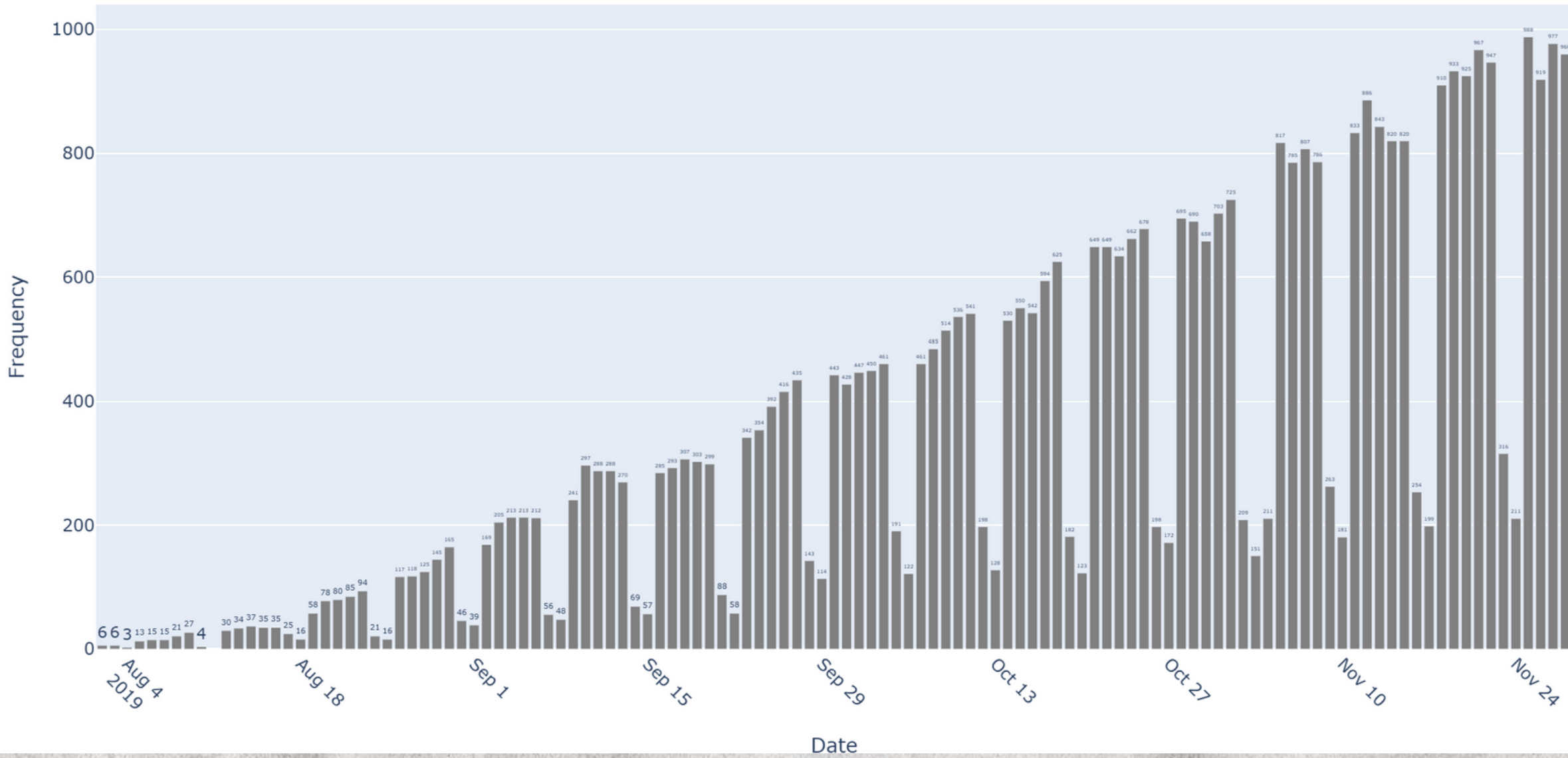
By Luis Pastrana

INTRODUCTION

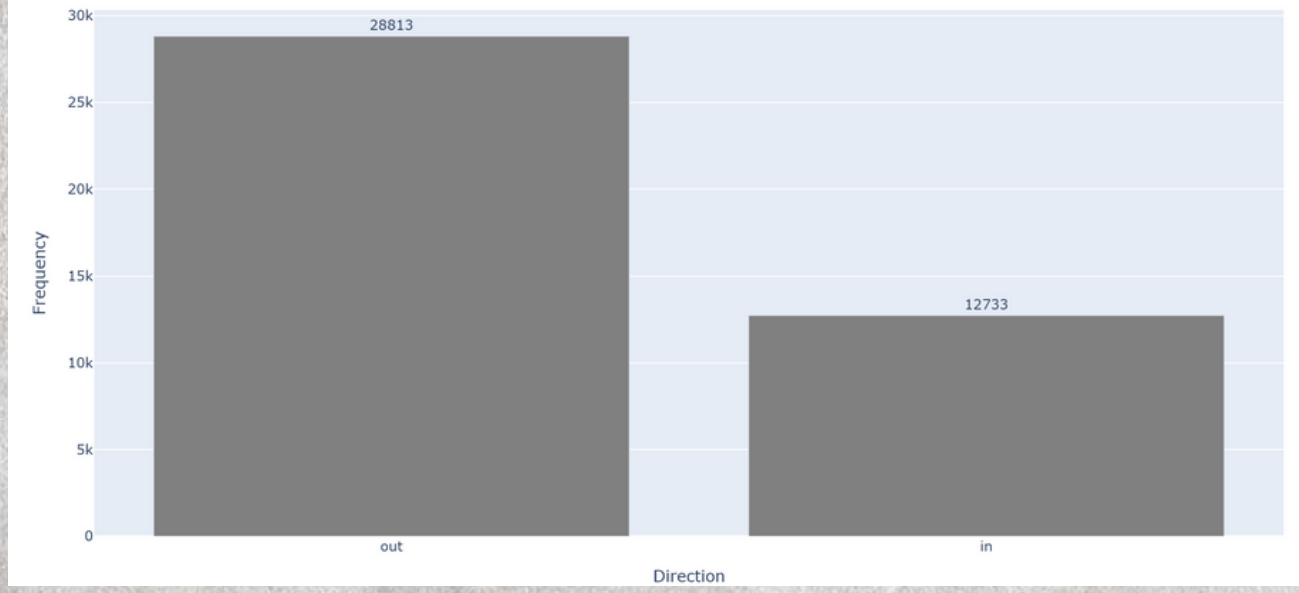
The virtual phone service CallMeMaybe is developing a new feature that will provide supervisors with information on the least effective operators. An operator is considered ineffective if they have a high number of missed incoming calls (internal and external) and a long wait time for incoming calls. Furthermore, if an operator is supposed to make outgoing calls, a low number of them will also be a sign of ineffectiveness.

CALL ACTIVITY DISTRIBUTIONS

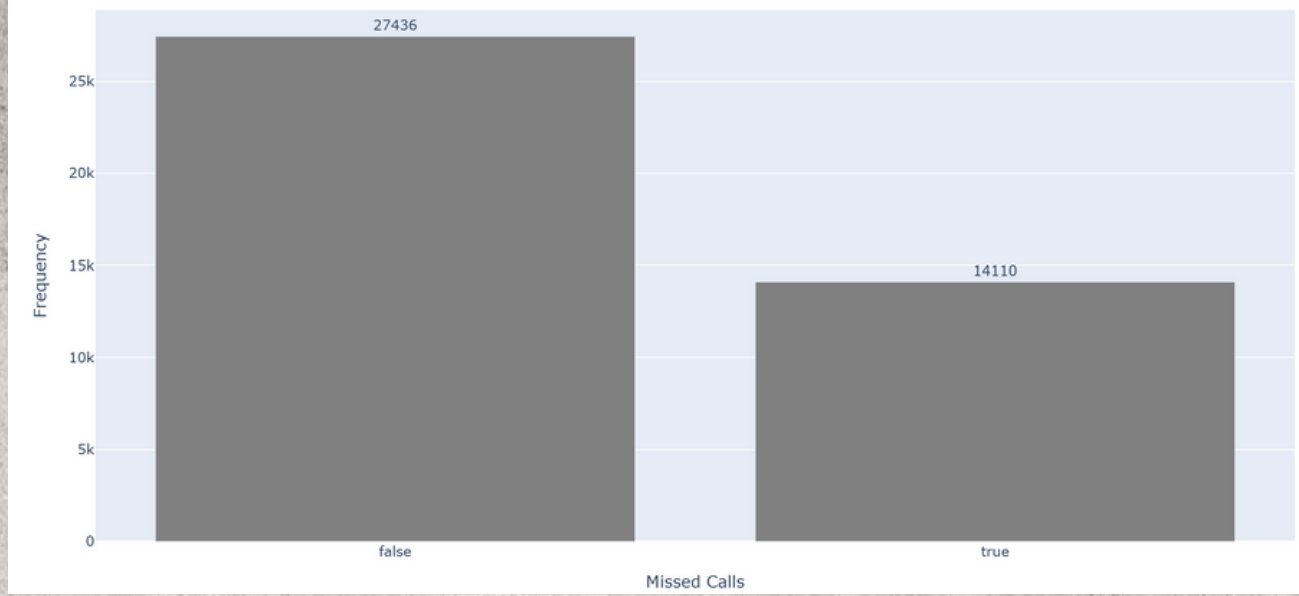
Call Activity Date Distribution



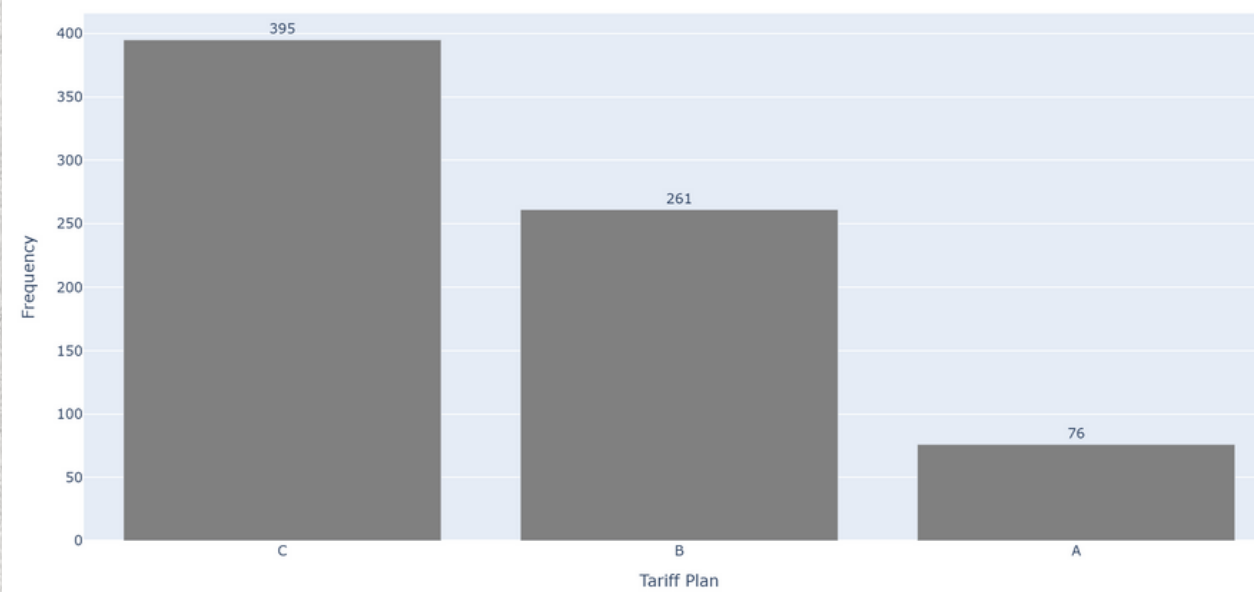
Call Activity Direction Distribution



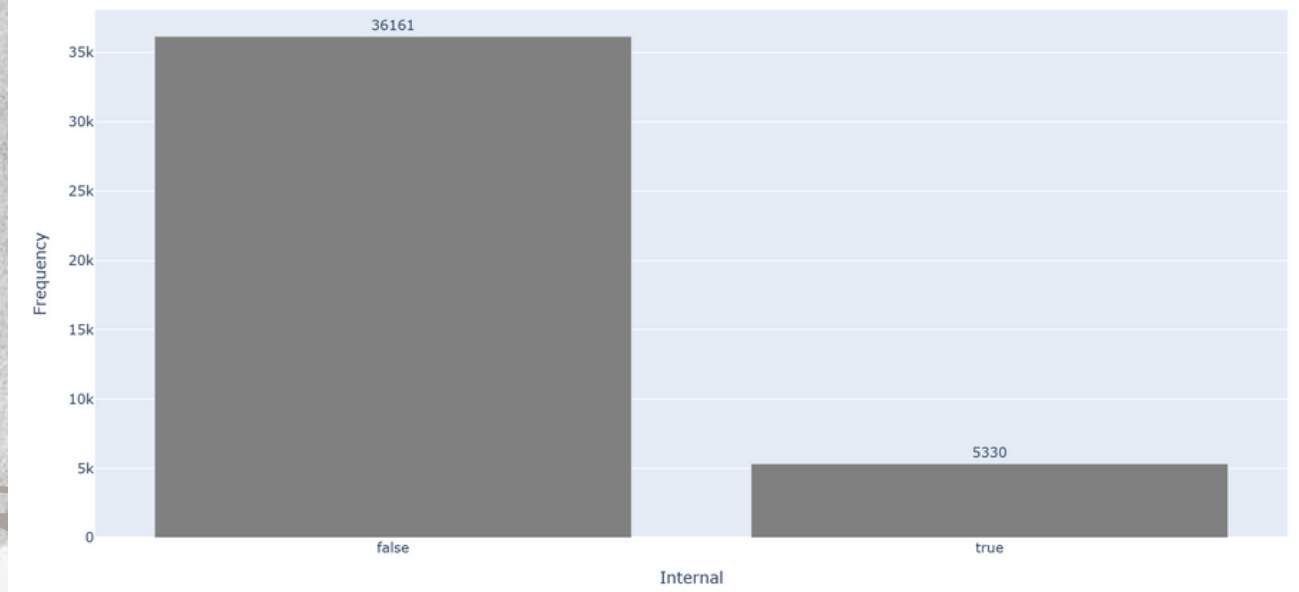
Call Activity Missed Calls Distribution



Client Tariff Plan Distribution



Call Activity Internal Distribution



METHODOLOGY

Considerations and Data wrangling :

Outliers were found. The duration range defined between 20 seconds (minimum) and 7200 seconds (maximum) was developed based on actual operational criteria for telephone service within the telecommunications sector.

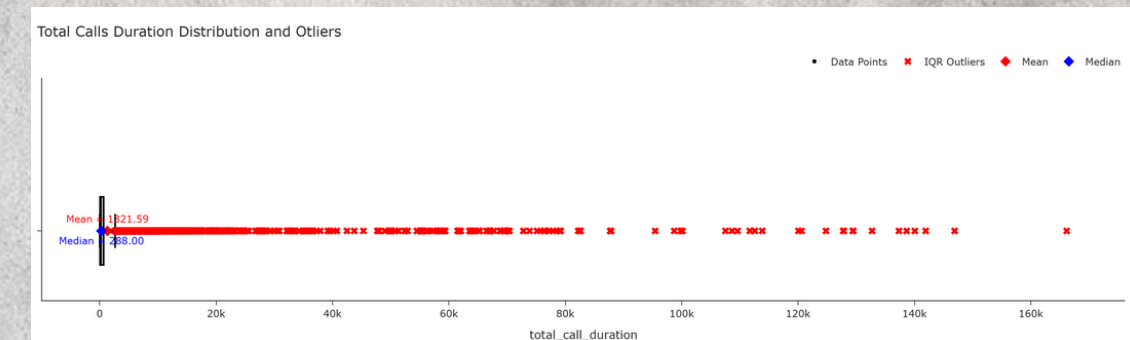
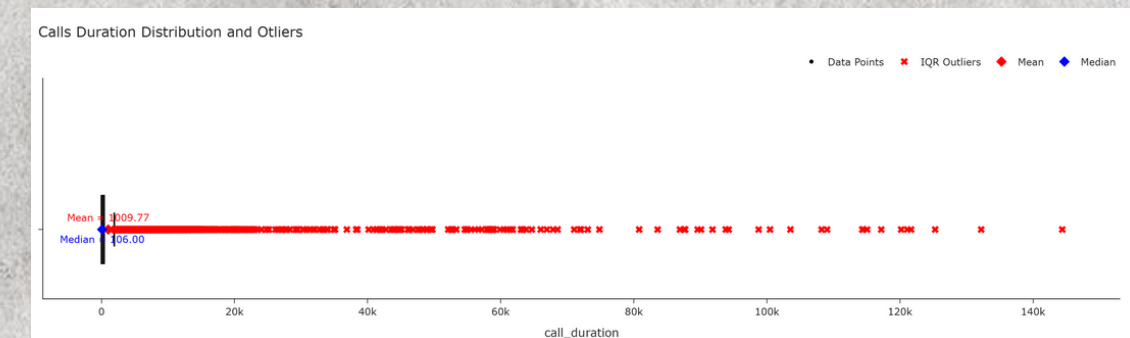
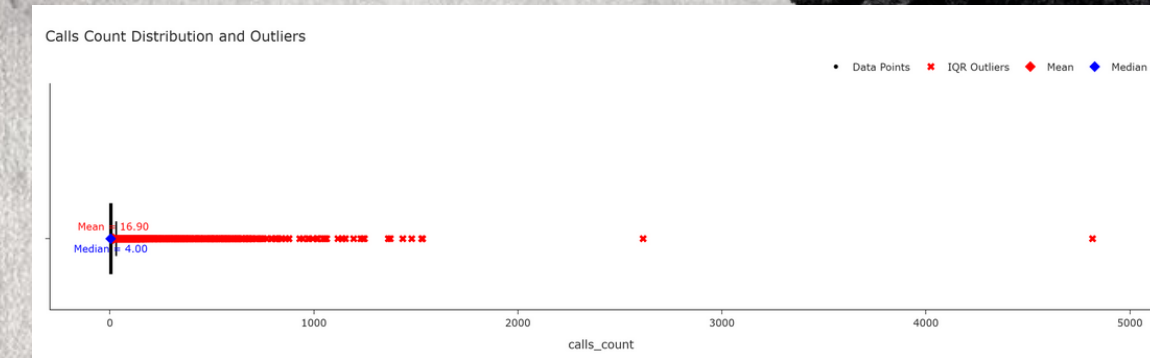
- ◆ Lower limit: 20 seconds. Calls lasting less than 20 seconds typically correspond to:

Incorrect calls or calls that are hung up before establishing contact (early abandonment). Instances where the customer hangs up during the automatic greeting or before initiating an effective interaction. Events that are not representative of the service process and therefore do not provide useful information about the operator's performance or the quality of service.

- ◆ Upper limit: 7200 seconds (2 hours)

In help desk and technical support environments, calls lasting longer than 7200 seconds (2 hours) are highly atypical and unlikely for reasons such as:

Internal support protocols establish session limits and automatic reassignment of complex cases. A call lasting longer than 2 hours may indicate logging errors (e.g., a call not closed in the system) or internal maintenance sessions, with no real attention. In analytical terms, these durations distort the mean and variance, affecting the interpretation of efficiency and SLA metrics.



OPERATOR EFFICIENCY

Formula proposal

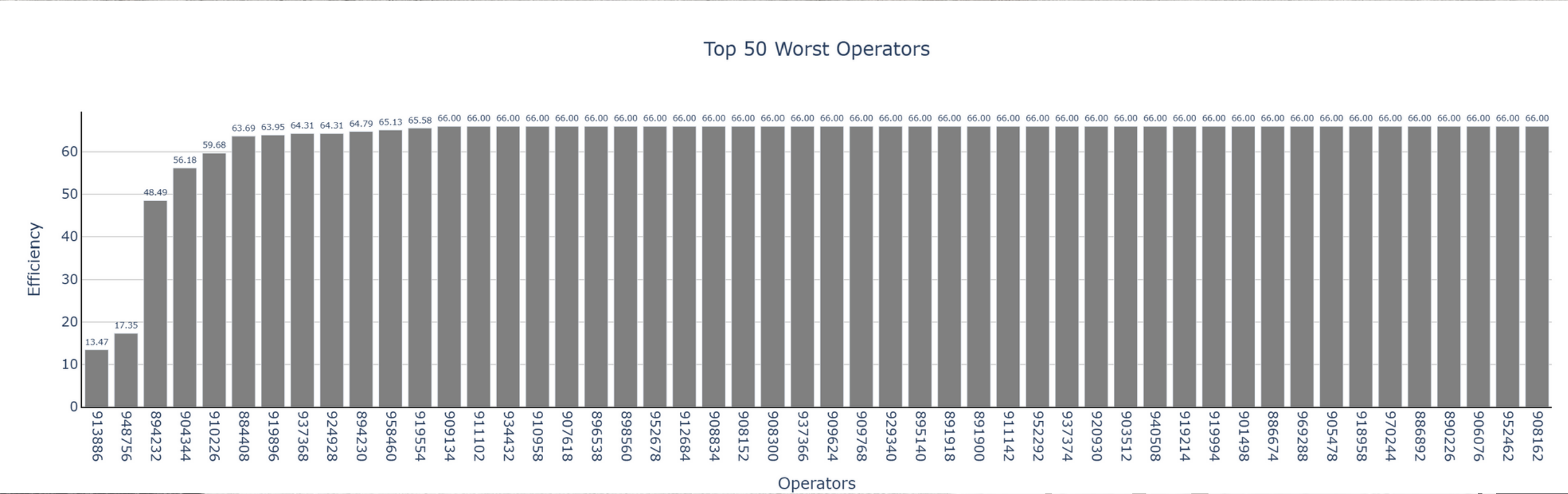
We want an efficiency score (E) between 0 and 100, where 100 = very efficient.

Based on three normalized components:

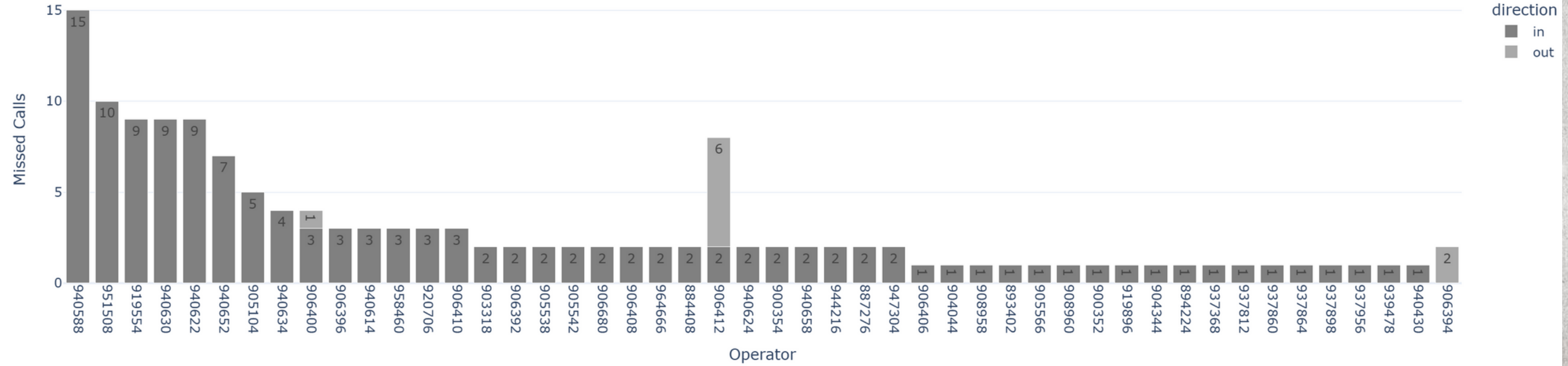
- Missed Rate (M) = proportion of incoming calls missed per operator. (0..1) – the higher the rate, the worse.
- Avg Wait Time (W) = average wait time for incoming calls (seconds). We normalize it to (0..1) using a reasonable threshold. – the higher the rate, the worse.
- Outgoing Activity (O) = relative outgoing activity (normalized outgoing call counts). Here, more is better.

Construction (a simple, interpretive form): $S = w_M * M_{norm} + w_W * W_{norm} + w_O * (1 - O_{norm})$, where $w_M + w_W + w_O = 1$

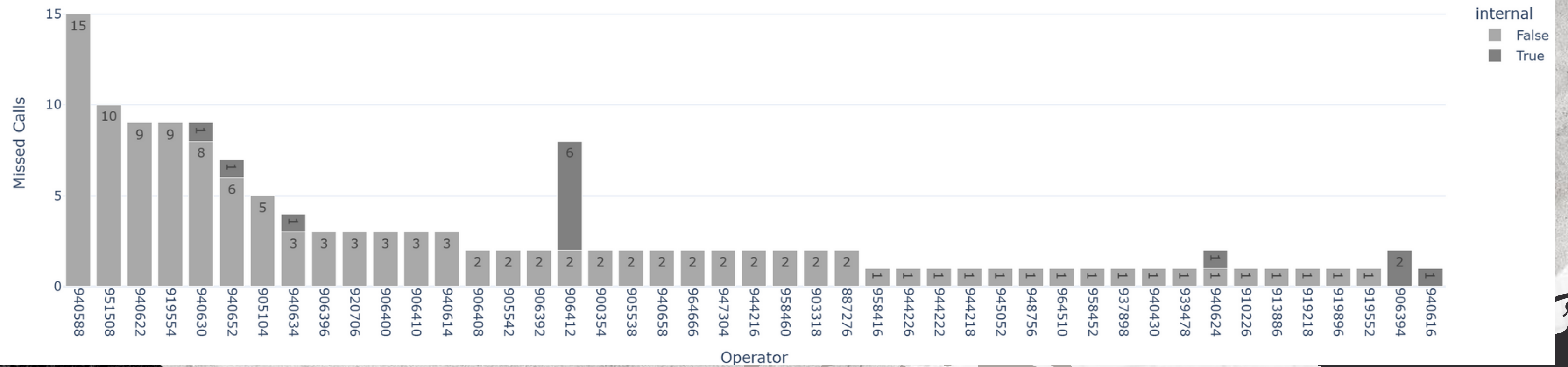
Finally, the efficiency: $E = (1 - S) * 100$



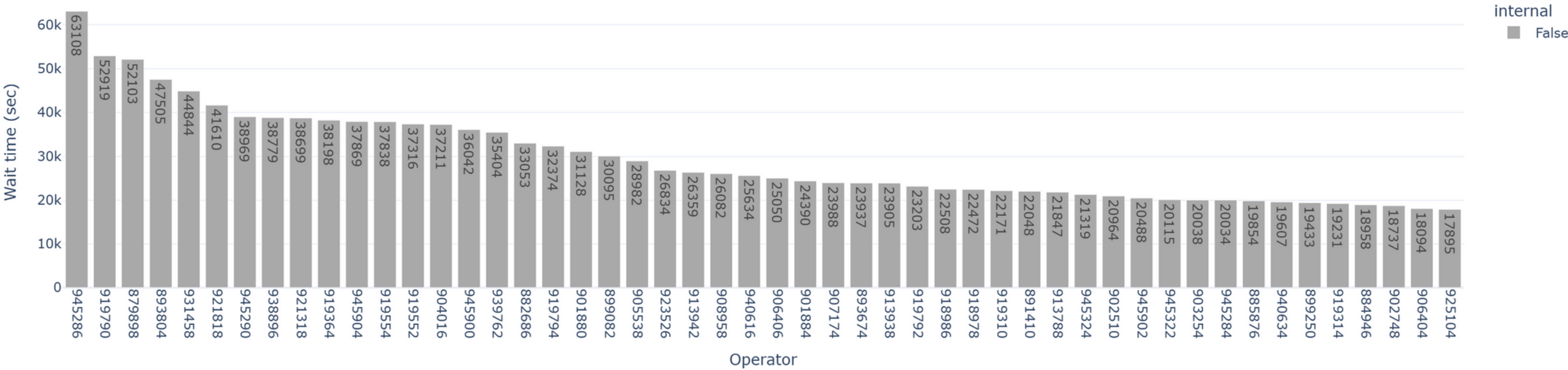
Top 50 Missed Calls by Operator and direction



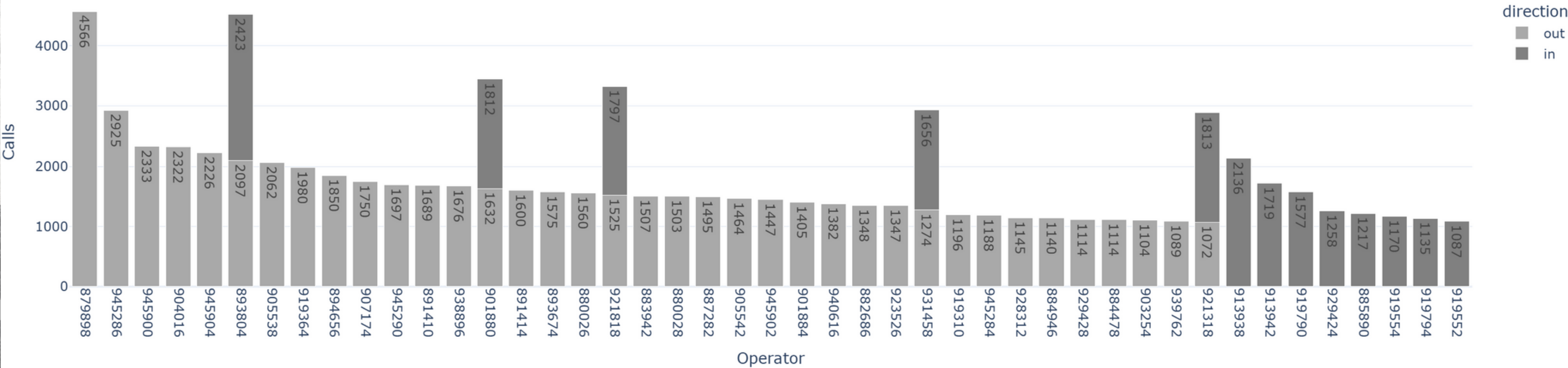
Top 50 Missed Calls by Operator and internal



Top 50 Wait Time by Operator and internal



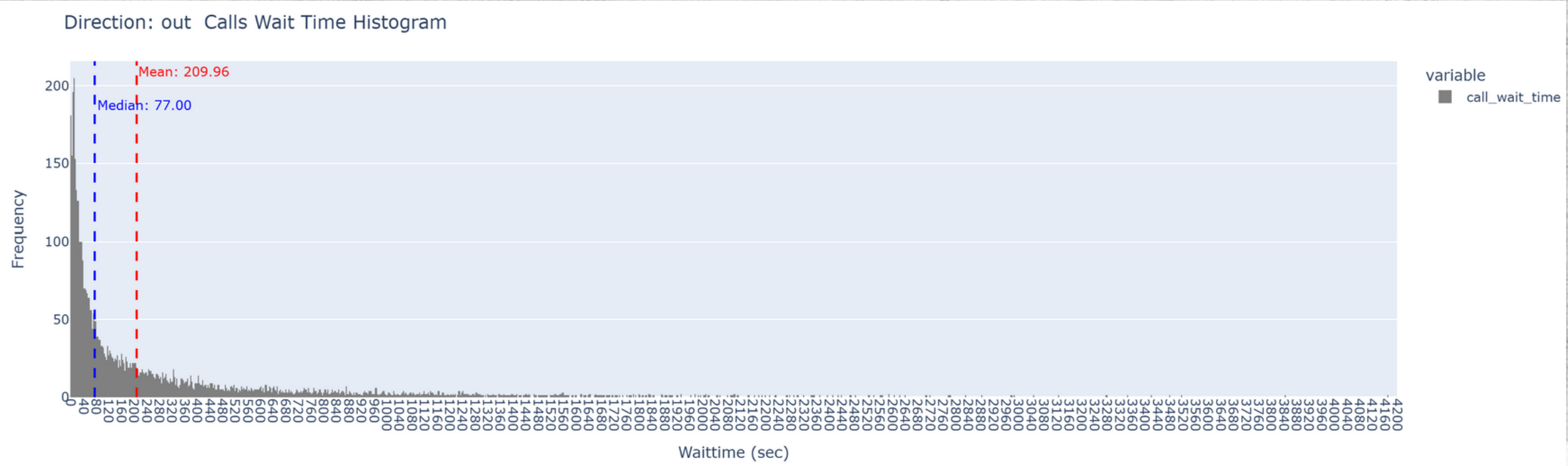
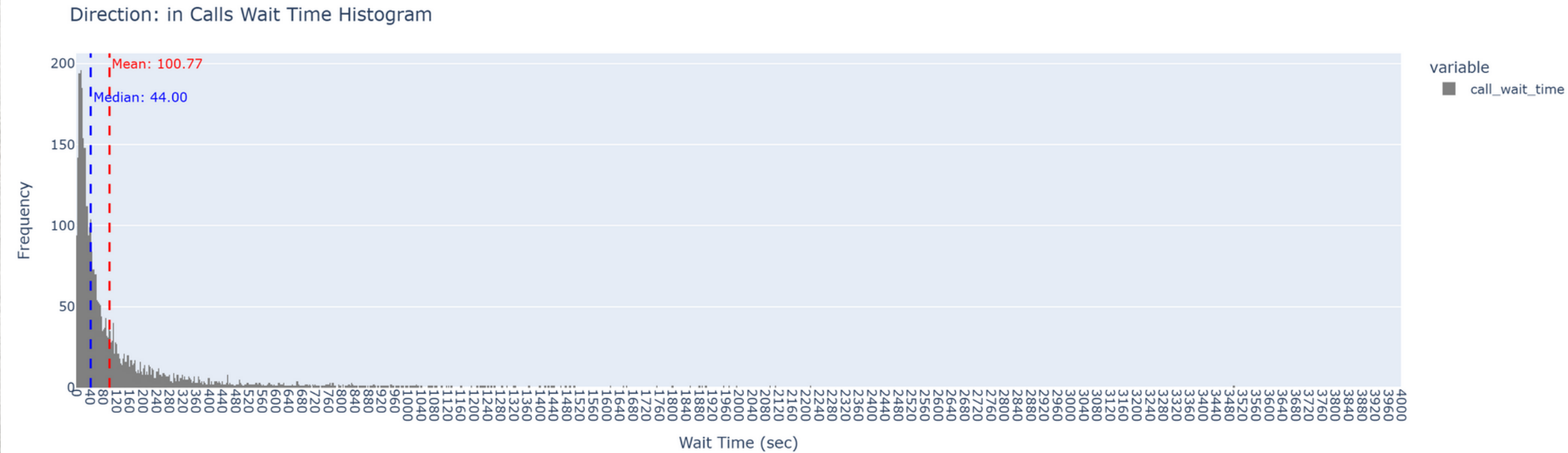
Top 50 Calls Count by Operator and direction



HYPOTHESES

H: THE AVERAGE WAIT TIME IS THE SAME BETWEEN INCOMING AND OUTGOING CALLS

ACCORDING TO INFERENTIAL STATISTICS, T-STUDENT: THERE IS SUFFICIENT STATISTICAL EVIDENCE TO AFFIRM THAT THE AVERAGE WAIT TIME BETWEEN INCOMING AND OUTGOING CALLS DIFFER SIGNIFICANTLY.



HYPOTHESES

H: THE PROPORTION OF DROPPED CALLS IS THE SAME BETWEEN TARIFF A AND TARIFF C
ACCORDING TO INFERENTIAL STATISTICS, Z-TEST: THERE IS ENOUGH STATISTICAL EVIDENCE THAT PROPORTION OF DROPPED CALLS BETWEEN TARIFF A AND TARIFF C DIFFER

Proportion of Missed vs Answered Calls - Plan A



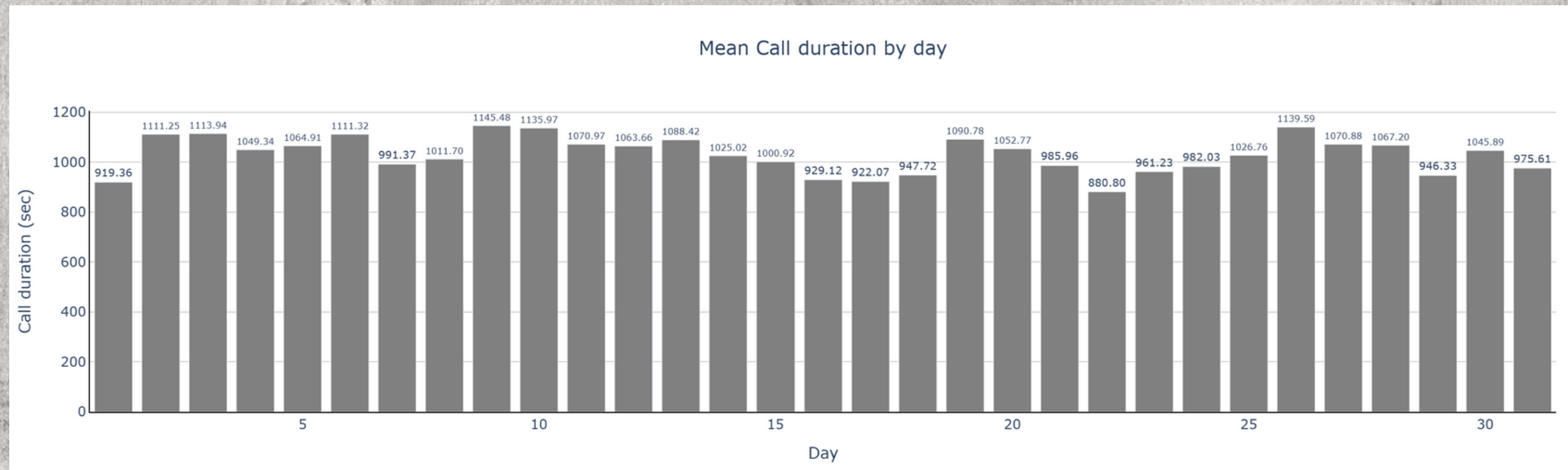
Proportion of Missed vs Answered Calls - Plan C



HYPOTHESES

H: THE AVERAGE NUMBER OF CALL DURATION IS THE SAME ON ALL DAYS OF THE WEEK

ACCORDING TO INFERENTIAL STATISTICS, ANOVA-TEST: THERE IS ENOUGH STATISTICAL EVIDENCE THAT THE AVERAGE NUMBER OF CALL DURATION ON AT LEAST ONE DAYS OF THE WEEK DIFFER



STRATEGIC INSIGHTS

Training Prioritization:

Operators with a low efficiency score (E) can receive specific training focused on reducing wait times and increasing the effectiveness of outbound calls.

Workload Management:

Since the average call duration varies from day to day, it is possible to redistribute the operational load or adjust shifts to improve availability during peak traffic periods.

Customer Segmentation:

The difference in missed calls between A and C rates could reflect different customer behaviors or deficiencies in priority service. It is recommended to evaluate retention and prioritization policies by plan type.

Dynamic Monitoring:

The efficiency model can be incorporated as a dynamic KPI into the dashboard (CallMeMaybe Dashboard), allowing real-time monitoring of each operator, historical comparisons, and early detection of operational deviations.

REFERENCES

Sources Found and Relevant Excerpts

1. Statistical Analysis of a Telephone Call Center (Brown, Gans, Mandelbaum, Sakov, Shen, Zeltyn, Zhao)

This is a classic publication on call center operational data, analyzing service duration, hold times, abandonment, etc.

Columbia University

In its abstract:

“The data comprise a complete operational history of a small banking call center... Each component involves different basic mathematical structures... models are developed... for forecasting of Poisson arrival rates.”

2. Call center service times are lognormal. A Fokker–Planck description (Gualandi, Toscani)

This article investigates that service times in a call center tend to follow a lognormal distribution, which implies the presence of extreme values but with a lot of dispersion.

arXiv

Relevant excerpt:

“In recent statistical analysis of real data, it has been noticed that the distribution of service times reveals a remarkable fit to the lognormal distribution.”

It interprets that there are indeed long tails (dispersion), but does not justify a call lasting 40 hours as “valid” per se.

REFERENCES

3. Analysis of the Dependency of Call Duration on the Quality of VoIP Calls

It analyzes VoIP call records (millions of records) and discusses that the relationship between quality and duration is not monotonic (higher quality does not always equal longer duration).

ResearchGate

"This paper analyzes call detail records of 16 million live calls... the connection between quality and duration is non-monotonic."

This suggests that extremely long calls may have technical explanations (quality, connection, bias) beyond the business.

4. Blogs and Reports on Service Level Standards and "Acceptable Wait"

The "80/20" standard: 80% of calls answered within 20 seconds is widely cited as a service level (SLA) metric in call centers.

ASL BPO

The SQM Group blog states that the average acceptable wait should not exceed two minutes to avoid degrading customer satisfaction.

These metrics would support the idea that a small threshold (e.g., 20 seconds) as a benchmark is common in the industry.

DASHBOARD

https://public.tableau.com/views/CallMeMaybe_17609814230870/CallMeMaybe?:language=es-ES&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

**THANK
YOU**