

# Telecom: Identifying Ineffective Operators

## Task

\*\*\*\*The virtual telephony service CallMeMaybe is developing a new function that will give supervisors information on the least effective operators. An operator is considered ineffective if they have a large number of missed incoming calls (internal and external) and a long waiting time for incoming calls. Moreover, if an operator is supposed to make outgoing calls, a small number of them is also a sign of ineffectiveness.

- Carry out exploratory data analysis
- Identify ineffective operators
- Test statistical hypotheses

## Description of the data

The datasets contain data on the use of the virtual telephony service CallMeMaybe. Its clients are organizations that need to distribute large numbers of incoming calls among various operators, or make outgoing calls through their operators. Operators can also make internal calls to communicate with one another. These calls go through CallMeMaybe's network.

The zipped dataset `telecom_dataset_us.csv` contains the following columns:

- `user_id` — client account ID
- `date` — date the statistics were retrieved
- `direction` — call direction (out for outgoing, in for incoming)
- `internal` — whether the call was internal (between a client's operators)
- `operator_id` — operator identifier
- `is_missed_call` — whether the call was missed
- `calls_count` — number of calls
- `call_duration` — call duration (excluding waiting time)
- `total_call_duration` — call duration (including waiting time)

The dataset `telecom_clients_us.csv` has the following columns:

- `user_id`
- `tariff_plan` — client's current plan
- `date_start` — client's registration date

Make a list of 5-10 sources (documentation, articles) that you used while working on the project. Provide brief explanations about the questions each source helped you answer. Prepare a

presentation with your findings. You can use any tool you want to make the presentation, but you must send it as a PDF. Put the link in the body of the main project.